

INTRODUCTION

TO THE

SCIENCE OF THE PULSE,

AS

APPLIED TO THE PRACTICE OF MEDICINE;

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NEW EDITION.



..... Me pulsus per integros duodecim annos medicinam facientem nunquam adhuc fefellit, sed sæpe tantum peperit mihi animi certitudinem, ut diem ipsamque horam mortis, ei soli confusus, sim ausus prædicere, et in illo quidem vix unquam temere, et in hoc vero non raro etiam eventum expectationi geminum habuerim.

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Dear Sir,

I have the pleasure to inform you

that

I am

Yours faithfully

Wm. H. Smith

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OF THE
DIAGNOSTIC, ORGANIC
AND
CRITICAL PULSES IN GENERAL.

THE dominion of the sphygmical science extends itself beyond the limits hitherto assigned to it by professional writers. These generally confine the science of the pulse to two branches: the one, connected with the *diagnosis*, includes the pulses called symptomatic, non-critical, organic, or pulses of the organs; and the other, which regards the *prognosis*, comprehends the critical pulses; viz., those announcing the approach of the rapid changes of acute diseases; which changes are usually called Crises.

A slight investigation of almost all the works which treat upon the pulse, will show that the whole of them turn upon two points, the *diagnosis* and the *prognosis*, or upon the organic pulses and the critical ones; with

this difference, that Fouquet has devoted his researches to the raising up the doctrine of organic pulses, which was certainly in its infancy, before he treated upon it expressly in his admirable work upon the pulses of the principal organic affections; whilst Galen, Aëtius, Salius, Alpinus, Struthius, Hoffmann, Solano, Nihell, Senac, Bordeu, Cox, Fleming, and various other celebrated physicians occupied themselves rather with the critical pulses.

The fact is, that the organic pulses of Fouquet, which are confined to the pointing out the presence merely of the various affections of the organs; and the critical pulses of Galen, Solano, Bordeu, and others, which solely announce the arrival of the crisis; both these pulses, whilst they are incapable of pointing out the state of the vital powers in chronic disorders, are likewise incapable of informing the physician upon the degree of their severity or intensity: hence, admitting for a single instant that chronic disorders are not derived from, and accompanied by local affections, as frequently happens in practice; in this case it follows, that the organic pulses cannot then take place, and much less the critical ones, since the latter are the harbingers of the crises, which, as will be shown, occur

only in acute diseases, and the former, the indicatory symptoms of the organic affections, which do not exist in the supposed case. Now, it is well known, that even in simple chronic disorders, in which local affections do not exist, and in which crises, properly so called, do not occur; that even in these diseases, recourse is successfully had to the examination of the pulse, and from it is deduced not only the degree of intensity, or atony, in which consist chronic disorders, but also the knowledge of the vital powers of the individuals suffering under them: it cannot then be said that the physician is enlightened by the presence of the organic pulses, or the critical ones, since neither of them exist, and are both absent.

Thus, in practice, various cases of simple acute diseases are to be found, which, precisely because they do not affect either this or that organ of the patient, are on that account unaccompanied by organic pulses, and much less so at their commencement by critical ones, that not being the time in which the crises take place. Besides, several kinds of acute disorders certainly terminate their course without the least sign or suspicion of crises. Now, it would certainly be strange to believe, or to maintain, that because neither or-

ganical nor critical pulses exist in certain acute disorders, the sphygmical art possesses, therefore, no other means of affording information to the physician in the examination of the pulse: in the absence of both of these, it offers a sure guide in the *diagnostic* pulses, which opportunely show the character, progress, and termination, favourable or unfavourable, of these acute disorders. And is not the guidance of the diagnostic pulses, that which should likewise be attentively followed in the cure of organic affections of old persons, and of children, when the characters of the organic pulses in advanced old age, or in infancy, are wanting, or when these characters of the organic pulses are stifled and hidden in the anomalies of the pulse, which are so peculiar and common to these two ages?

Now, the pulses which we call *diagnostic*, are, 1°. The great and small pulses. 2°. The hard and soft pulses. 3°. The strong and weak pulses. 4°. The quick and slow pulses. 5°. The frequent and rare pulses. 6°. The equal and unequal pulses; denominations which have, in fact, been in use from the time of Galen to the present day; notwithstanding which, however, the diagnostic pulses and their peculiarities have not been thoroughly examined by medical writers.

It was, therefore, of the greatest importance, in the present state of human knowledge, to enlarge the confines of the dominion of the sphygmical science, as far as a true acquaintance with the *diagnostic* pulses : these, as being neither critical nor organic, have the merit of indicating, in the diseases in which they occur, the state of the vital powers, and the character and degree of intensity of the diseases themselves. The diagnostic pulses are, therefore, those which must be referred to a third branch of the science, or to a third order of pulses, which require much more investigation than has hitherto been bestowed upon them by medical writers, who have treated them either in too general and vague a manner, or considered them as accidental and secondary pulses, or erroneously confounded them with organic ones, as, we shall see, was done by the Chinese physicians. Besides, the diagnostic pulses perform an active part, and are primary signs in every disease, in which there do not exist either critical or organic pulses, as is found to be the case every day in chronic disorders free from all organic affections, and also in acute simple diseases, which, as I have said, frequently terminate their course without the least indication or suspicion of crisis : in short,

the diagnostic pulses have a peculiar and independent existence, and possess a character which distinguishes them from the critical and organic pulses.

The diagnostic pulses differ, in the first place, from the organic pulses, because the one consist, as we shall see, in so many particular movements along the whole space of the pulsatile artery, and are constantly uniform throughout their entire length; whilst the others exhibit themselves under the form of so many small eminences more or less pronounced; and these, instead of occupying the whole length of the pulsatile artery, as the diagnostic pulses do, limit themselves, on the contrary, sometimes to one part and sometimes to another only, beyond which, not the least sign or trace is perceptible. Besides, therefore, the difference of form between the beatings of the organic pulses and those of the diagnostic ones, another peculiarity must also be remarked, viz. that the latter, as we have said, are observable throughout the whole length of the pulsatile artery, and the former sometimes in one and sometimes in another small portion of it, as will be seen in the treatise upon organic pulses.

With still greater reason the diagnostic pulses differ from the critical ones, as well because these only show themselves at the moment when the crises approach, and disappear after their termination, as because the critical pulses are all characterized, at one time by the reduplication of one or more diastoles, as is found in hemorrhages; at another by the suspension of one or more beats, as is observed in ventral fluxes, and at another time by an equally marked irregularity, which forms the peculiar character of another critical pulse, and so on: and this is certainly not the case with the diagnostic pulses, which persist in exhibiting themselves constantly under the same specific characters, characters which are entirely different from the irregularities characterizing the critical pulses, and from the eminences of the pulsatile artery which are the attributes of the organic pulses. To this threefold order of *diagnostic*, *organic*, and *critical* pulses, we are, as will be seen, led by daily practical observation.

FIRST ORDER

OF

THE DIAGNOSTIC PULSES.

ART. I.

OF THE GREAT MORBOSE PULSE.

THE great morbose pulse, which determines the excess of its natural greatness (when that greatness exists), is indicated by a strong reaction or decisive force, which the artery exerts against the exploratory organ, in order to free itself from its pressure; and its greatness is proportioned to the calibre of its diameter, to the mass of the blood, and the degree of force which the left ventricle displays, whilst, by its contractions, it forces out the blood through the aorta. Haller's opinion upon the cause of the morbose greatness of the pulse, nearly coincides with that we have just delivered. His words are these:—" *Magnus pulsus erit, in quo arteriæ diameter quam maxima redditur.* " *Magnus adeo pulsus erit, quoties multus in corde sanguis abundat, et cor eum sanguinem valide*

*"promovet."** In fact, the elevation produced by the artery along the diastole, by means of the impetus which the sanguineous waves or columns receive from the contractions (at that time more energetic) of the left ventricle, is precisely that elevation which occasions a like impression upon the organ of touch, then making the examination; and the more the artery raises or dilates itself in the diastole, the greater is the pulse, and consequently, the more energetic must be the contractions of the left ventricle, which are the cause of it.

The measure, therefore, of the morbose greatness of the pulse is found; 1° in the calibre of the artery: 2° in the increase of its diameter: 3° in the degree of force employed by the left ventricle in contracting itself: 4° in the quantity of blood which may arrive there in a greater or less time, in the interval of its diastole. Which circumstance plainly shows that the value of the great pulse does not depend wholly upon the character and degree of intensity of the diseases which produce it, since the calibre of the artery, the physical state of the individual, the difference of sex, age, and climate, together with a series

* Haller, Op. cit. lib. vi. p. 268.

of secondary circumstances, varying infinitely in different individuals, concur in it. In fact, even when an hypersthenic or phlogistic disease, attacks, with the same degree of force, a woman of middle age, an adult, and a very old man, all three persons being equally well organized, nevertheless the pulse of the adult will be greater than that of the woman, and still more so than that of the old man, for a self-evident reason; viz., because the pulse, which in the healthy state is not great in the woman and in the old man, but is so in the adult, must necessarily be greater in the latter, since the pulse of all the three individuals receives, from the same disease, an equal quantum, so to speak, of morbose greatness; and should it happen, on the contrary, that the pulse of the woman, or of the very old man becomes, or should be, *cæteris paribus*, greater than that of the adult, it would induce us to judge the disease of the two former to be dangerous, but not at all so that of the latter.

That the great morbose pulse, moreover, is a distinct symptom of the diseases of excess of tone, which are also called hypersthenic, is deduced from practical observation; for the great morbose pulse exhibits itself in inflammatory fevers, in phlegmasies, sanguineous apoplexies, active hemorrhages, and in other

similar acute diseases, to the intensity of which very frequently correspond the various degrees of morbose greatness of the pulse. The patients affected with inflammatory fevers breathe with great rapidity; their pulse, therefore, beats more quickly than in the state of health; its beats are elevated, developed, and therefore great, as may be gathered from the degree of the strength employed by the artery against the exploratory organ; and all the organic functions appear altered, elevated, or exalted at the same time, especially the circulation of the blood and the respiration, in consequence of the state of plethora which generally predominates in the body of patients of this description, and of the energy with which their heart then exercises its contractions.

The observation of the great morbose pulse is so common in phlegmasies and inflammatory fevers, that where acute diseases of an equivocal character are in question, it is only the morbose greatness of the pulse which can determine it, especially, when the patients belong to the lower class of society, from whom it would be in vain to expect to receive certain information respecting the various circumstances relative to the disease which afflicts them. And what is worse is, that diseases of an obscure or equivocal character generally have a

fatal termination, according to the result of practical observation ; such is particularly the case with certain kinds of apoplexy, of hæmoptysis, or hemorrhage of the lungs, and not a few epidemic fevers, whose character frequently keeps in uncertainty and perplexity the most experienced and able physicians. The truth is, that in this doubtful state a most serious error might be committed, that of bleeding, when such an operation could not but be fatal ; or of neglecting it, when it would be of the greatest service. In these cases it is necessary to consult the value of the pulse, which shows the character of different infirmities of the human race.

On the other hand, no risk is run in bleeding, in acute disorders of obscure or equivocal character, when the result of the analysis of such diseases agrees with the elevation and greatness of the beats of the pulse ; unless the deterioration of the physical strength of the patient opposes it, or there be a conviction in the mind that any abstraction of blood would disturb Nature in her endeavours to resist the continual effects of the course of the disease ; and, unfortunately, such instances are not rare in practice ; for it is not in the power of every practitioner to appreciate at a glance

the state of the vital powers of his patient, and the duration or resistance of the disease; and it is owing to this defect of judgment, or nice discernment, that practitioners lose their patients, more frequently from the failure of their vital powers, at a time when it is most requisite to resist the attacks and continued effects of the disorder, which is in progress, than from the malignant character of the disorder itself. But bleeding is certainly never required in acute diseases of an equivocal character, when, in similar cases, the beats of the pulse are small, weak, or slow, as we shall have occasion to show in our examination of those pulses.

In order to avoid, however, all mistakes, it is here necessary to remark, that in various cases of acute diseases, the pulse is sometimes so deep and obscure as to surprise those who have not been in an extensive practice, or who have exercised the medical art in cold climates only; as the phenomenon of the obscure and deep pulse is observed in certain acute disorders which predominate in the southern climates, and generally attack countrymen, mechanics, and young men of robust constitution and short stature. In these, more than in the inhabitants of cold countries, the

exercise of the circulation of blood becomes extremely difficult, when those persons are attacked by certain inflammatory fevers; both because the powers of the arteries, dilated to the utmost extent by the quantity of the sanguineous waves, are as if paralyzed, and must, of necessity, contract and dilate themselves with difficulty, inasmuch as they are full and obstructed with blood; and because this fluid then becomes very thick and dense, and for that reason its stimulus is no longer fitted to excite the arteries with the wonted energy; and from this excessive fulness of the arteries and density of the blood arises the deep, obscure, and difficult pulse, such as it exhibits itself in persons attacked by inflammatory fevers, which predominate, as I have before observed, in southern climates; although the obscure, deep, and difficult pulse is not an ordinary symptom of acute disorders of excess of tone, in which the beatings of the pulse are in ordinary cases great, strong, and elevated.

The observation of the deep, obscure, and difficult pulse was made for the first time in certain young reapers of the provinces of Lecce and Bari, who were attacked by a very severe inflammatory fever, which was accompanied by this pulse. This observation gave

rise to the reflection that it was not regular for the pulse of reapers, who are generally robust and plethoric young men, to be deep, obscure, and difficult in the inflammatory fevers to which they are subjected; besides the certitude accompanying this acute disorder, the state of plethora, which generally predominates in such persons, authorize the having recourse to bleeding, although the depth and difficulty of the beatings of the pulse would have indicated that such a remedy should not be practised. The fact is, that the first abstraction of blood was immediately succeeded by the elevation and developement of the pulse, which the too-great repletion of the arteries overcharged with blood, certainly prevented from beating with greatness, elevation and fulness, as it does in the ordinary cases of inflammatory fevers, when unaccompanied by too great repletion or excessive overcharging of the blood-vessels.—From that time, we have always continued the use of phlebotomy in similar cases, and the effect of this resource of art has always corresponded with our expectation. The other observation of the deep, obscure, and difficult pulse, presented itself in the case of three or four adults struck with sanguineous or ple-

thoric apoplexy, and the bleeding to which recourse was had, likewise produced the elevation and developement of the rhythm of the deep, obscure, and difficult pulse.

Notwithstanding this, however, bleeding is a resource of art directly debilitating. Bleeding, by abstracting from the mass of humours a given quantity of blood, must necessarily diminish the activity of the stimulus of this vital fluid, which is in a direct ratio of its mass. In this point of view, bleeding can produce two effects apparently contrary; it may develope and dilate the deep and obscure pulse, when its depth and difficulty of beating arise from too great repletion, or excessive overcharging of the arteries, as we have before observed in the above practical cases; and it can diminish the elevation and greatness of the pulse when this is excessive: and this expeditious and safe method of bleeding, by which we can keep the morbose greatness of the pulse in hypersthenic diseases, or in those of excess of tone, within the limits of moderation, is the method, I repeat, which in general removes any cause for apprehension, arising either from the character of the great pulse, or from that of the diseases which it accompanies.

In fact, as long as the great pulse does not

proceed on too rapidly, nor become small, changing itself every moment in the course of acute diseases, it is always a sign that nature does not want any strength or energy, and that the disorder is making a regular course. Its presence in the more advanced period of phlegmasia may announce the approach of a salutary crisis, especially if the pulse from small, weak, and thin, becomes great, developed, and dilated, and if in proportion as it gradually becomes greater, all the symptoms of fatal import, such as delirium, lethargy, convulsions, and others equally alarming, begin to weaken, and disappear. But however favourable may be the augury from the increase and successive elevation of the rhythm of the pulse in acute disorders, the sudden change of the small pulse into one excessively great and full, is a fatal omen, especially in apoplexies; above all when this pulse is accompanied by lethargy, or a profound sleep, which most often degenerates into a mortal apoplexy. Thus, therefore, the more sudden and rapid the change of the small pulse into the elevated and great one, and the greater the want of sleep experienced by the patient, the more imminent may be his danger, and the more certain his death.

The means afforded by nature of foreseeing whether the sudden elevation of the pulse is a good or bad omen in acute diseases, is that of observing if the other signs or symptoms accompanying them diminish in number and intensity, or whether they manifest themselves with greater violence, or increase in number. In this case, the elevation or greatness of the pulse is of no avail; since every thing announces that nature is overcome by the violence and severity of the disease, and the smallness and weakness of the pulse then necessarily succeed to the elevation or greatness of its rhythm. Such, at least, is the result of practical observation.

ART. II.

OF THE SMALL MORBOSE PULSE.

THE opposite of the great pulse is called the small pulse. The small morbose pulse, in fact, takes place when the efforts made by the artery, in order to free itself from the pressure of the exploratory organ, diminish almost to nothing, or are scarcely perceptible. The cause of this effect is especially found in a deterioration of the physico-vital powers of the heart, as is observed in certain diseases of languor ; I say especially, because the contractions of its ventricles are performed so languidly, that they do not, except very imperfectly, concur in the object of nature, as soon as they cease to impel the blood into the arteries with their accustomed force and energy :—from a deterioration of the physico-vital powers of the heart, and from the languor of the contractions of its ventricles, necessarily arises the difficulty of the course of the blood, and the smallness of the beatings of the pulse ; for the blood which

is not driven by the contractions of the heart into the arteries with the requisite strength and energy, cannot excite and put into the necessary activity their systoles; hence, the arteries cannot and ought not to recover their natural dimensions, in consequence of their imperfect contractions; the more so as their own strength is weakened, their diameter does not recover and develope itself as it should do, and the small morbose pulse takes place. For this reason, Haller, after having treated of the great pulse, expresses himself in these terms: *Contrariæ causæ pulsum parvum faciunt, quem superiores aliqui inanem vocant. Parvus autem est, quando arteriæ diameter non increscit, parvæque etiam in systole cordis manet.*" And then he adds, "*Plerumque tamen pulsus ideo parvus est, quia vires cordis exiguæ sunt, ut omnino arteria parum dilatetur.*"*

All the above-mentioned circumstances relative to the origin of the small morbose pulse, clearly show how much the depression of the vital powers must, in conjunction with the deterioration of the tonicity of the heart and arteries, contribute to its existence. Thus it will be important to remark here, that the gra-

* Haller, Op. et loc. cit, p. 269.

dual weakening of the respiration which follows the sensible slowness of the course of the blood, not permitting to this fluid, to renew in a given time its vital qualities, the various organs of man cannot consequently receive, as they ought to do, the elementary principles of their respective strength, in proportion to their wants; and the weakness of different organs is reflected, rather than not so, upon the pulse, which must, of course, gradually get smaller and smaller, if the means of the art be not had recourse to in time. Now, who could doubt for an instant, that the small morbose pulse is a distinctive sign of hyposthenic diseases, or those of languor, and that it must point out, by its different degrees of smallness, their various species, and even their various degrees of intensity?

But, however necessary it may be to consider the small morbose pulse as a sign which indicates the presence of diseases of languor, called by modern writers hyposthenic; it is no less so to recall to mind the observation that the morbose smallness of the pulse, which is not an absolute variation, may be found combined, and often does in fact combine, with its natural smallness, as is exactly observed in hypo-

sthenic diseases of children : and it would certainly be a strange thing in practice to believe that a young man and a child are both of them equally in great danger, when the same disorder which afflicts them is indicated by the same degree of smallness of the pulse : for the evident reason that, *cæteris paribus*, the pulse of a child is incontestably naturally smaller than that of a young man, for reasons already adduced in the first part of this work, where we have treated of the variations assumed by the pulse in different periods of life. And it must be remarked that the case is not rare, of finding the pulse naturally small in the healthy state of several other individuals of either sex, although these latter have not the appearance of it, on account of their age. The reason, therefore, becomes still stronger, why we should be convinced that it is necessary for the advancement of the sphygmical science to know *a priori*, the natural state of the pulse of every individual, and estimate consequently the degree of morbose smallness of the pulse by the standard of its natural one, when the latter concurs with it.

The observation to be made respecting the small pulse is, that although its presence generally indicates the existence of some

diseases of languor, it may nevertheless, and does in fact, exist in the attacks of certain acute disorders of an opposite character; and it is the more necessary not to confound the small pulse which is observed in the paroxysm of acute diseases with that which sometimes takes place in their progress, as it is of greater importance in practice to distinguish an hypersthenic disease, or one of excess of tone, from any other disease of a contrary nature. All physicians know, in fact, that in the attack or paroxysm of any acute fever, which is called the period of irritation, the system of the solids is subjected to a kind of convulsion or general contraction, and this, by its nature, hinders the heart and arteries from oscillating freely; the blood consequently cannot circulate without much difficulty, especially in the capillary vessels on the surface of the body, and hence proceed the shivering fits and the small pulse. After the period of irritation, convulsion, or contraction, the pulse becomes extrinsic, elevates itself more or less, and is not found so small in the second period as in the first.

Now it is in the second period that acute disorders develope themselves, and generally exhi-

bit their proper character ; a character which is certainly to be gathered from the nature of the pulse. In general, if the pulse elevates itself from smallness to a degree, more or less high, of greatness in the second period, the disease is then of an hypersthenic or phlogistic character ; or the pulse maintains itself nearly within the limits of its smallness, in which case the disease is of an hyposthenic or anti-phlogistic nature, unless local inflammatory causes, or organic affections, concur, which impart to it the apparent form of an hypersthenic disease, whilst in reality it is not so ; a case not rarely found in practice.

It would therefore be desirable, that the ancient division of diseases into acute and chronic should cease to guide the majority of medical practitioners ; as well because a great number of them believe all acute disorders to be of an hypersthenic character, whilst the smallness of the pulse sometimes shows the contrary, according to practical observation ; as because instances are not rare in practice of seeing certain chronic disorders transformed into acute ones, by means of an empirical treatment, or some other mischievous cause. To this change of character are particularly subjected, asthma, gout, rheum-

atism, and many other similar diseases, which, although common, are obstinate and little understood. The small morbose pulse, or the great morbose one, is therefore that which ought to guide the medical practitioner at the bed-side of the patient, and not the old division of diseases into acute and chronic.

In fact, the small pulse, as an effect of the deterioration of the vital powers of the heart, and of all the other organs, must necessarily accompany diseases of extreme atony, a proof of which we have in the typhus, gangrene, and sphacelus, in which we constantly observe the small pulse. The same likewise accompanies pulmonary phthisis in an advanced stage, hyposthenic dropsy, and false or spurious congestions of the viscera of the lower belly: it indicates the presence of nervous affections of the stomach, as well as all the other diseases of weakness, to the existence of which, in concurrence with the depression of the vital powers, contributes the deterioration of the partial function of the heart and arteries, from whence proceed the slackening of the circulation of the blood and the smallness of the pulse, which forms the distinctive character of hyposthenic or antiphlogistic diseases. And it is on account of the diffi-

cult and slow circulation of the blood, resulting from the presence of polypi or aneurisms of the heart, or of the aorta, that the small pulse takes place, as we shall see, in similar organic affections.

Hence, the presence of the small pulse in the morbid state is certainly not a favourable omen : either this is produced by the weakness of the vital powers, and the means of recovery is by no means easy in many cases of malignant fevers ; or it is the effect of organic affections of the heart, the centre of internal life, and it cannot be said that the medical art possesses remedies capable of successfully conquering them, especially when they are somewhat advanced ; or it indicates organic affections of the stomach, neither are there means of dissipating them ; or it takes place in the commencement of inflammations of the first order, and announces their fatal termination ; or it is derived from the exhaustion of the vital powers, in which epidemic fevers apparently consist, and therefore it must necessarily predict their fatal event. In short, the whole of this examination leads us to determine the character of the small pulse to be in no wise favourable. But it will not be suf-

ficient to confine our remarks to the above observations, in order to make an intimate acquaintance with the character of the small pulse; it is necessary to observe that its presence is of the worst augury in the pulmonary phthisis, and in hyposthenic dropsies; it predicts the fatal termination of gangrene, and leads to an unfavourable opinion upon the issue of phlegmasies; it gives just reason to apprehend the unfavourable event of variola or small-pox, scarlatina, and every other similar cutaneous disorder, when the eruptions of either are suppressed in consequence or by means of bad treatment: in all these cases, the presence of the small pulse is always suspicious and completely unfavourable.

It is here necessary to point out the relations which unite the smallness of the pulse with the other symptoms of the disease; for it might occur that the smallness of the one exceeds the severity or intensity of the others; or that it exceeds the limits of gravity of the disease itself. In general, in order that the prognostic deduced from the smallness of the pulse be well founded, it is necessary that the severity of the symptoms of any hyposthenic disease should accord with

the various degrees of smallness of the pulse ; otherwise the risk of error is incurred, as its excessive smallness may be symptomatic, arising from secondary causes, as from a visceral or local obstruction, which often takes place in febrile diseases, or else its greater part may be natural to the pulse of the patient.

ART. III.

OF THE HARD MORBOSE PULSE.

THE idea of the character of the hard pulse arises from the sharp, resisting, and hard sensation, which the pulsatile artery generally causes against the exploratory organ of the pulse. In order that the hard pulse may take place, it is necessary that the arterial tunics or parietes be tense and rigid, as is naturally observed in the arteries of old people, or they are so in consequence of a morbose cause, or disease. The other circumstance which may also concur in it, is the density or thickness of the blood, which being deficient in white humours, or serum, must of course become dense and thick, as is generally observed in ardent or gastric fevers. In these two circumstances may also concur, in the third place, the vehemence of the contractions of the heart, which, united with the above causes, produces the highest degree of hardness of the beatings of the pulse.

Haller, speaking of the hard pulse, points

out the causes of it very clearly, when he says: *Ejusmodi pulsus fit, quando arteriâ rigida, et tensa, et sanguis viscidus, et concretioni proximus est, et a corde vehementer urgetur.**

Hence it appears clear, that when the hardness of the pulse is not derived from the rigidity and natural tension of the arterial tunics, as is observed in the pulse of old people, it must, in every other case, be considered as an effect of elevation of the vital properties, and as a sign which indicates the vehemence of the contractions of the heart, the scarcity of the serous part of the blood, and consequently the presence of phlegmasiæ or hypersthenic diseases, in which a local inflammation predominates. Of this nature, it is well known, are pulmonia, pleuritis, carditis, phrenitis, and also many other partial inflammations of organs or internal viscera: which is equivalent to saying that the hard pulse is no longer a distinct symptom only of the pleuritis, as several medical writers erroneously pretend, nor of the colica pictonum, according to Stoll's observation. As soon as the tension and rigidity of the arterial tunics combine with the

* Haller, Op. et loc. cit. p. 269.

density and thickness of the blood, and also with the vehemence of the contractions of the ventricles of the heart, in various phlegmasiæ, according to the result of practical observation, what further reason may be adduced in order to account for the hardness of the pulse in pleurisy only, or in the colica pictonum?

Thus, it is proper here to remark that the degree of hardness of the pulse varies in different diseases which it accompanies; together with another peculiarity deserving of observation: viz., that the hardness of the pulse, united with the greatness or strength of its beatings, is the index of diseases of excess of tone; and, on the contrary, of those of weakness, when the hardness of the pulse is combined with the smallness of its beatings. Hard and great, in fact, is the pulse which is observed in phlegmasiæ, inflammatory bilious fevers, in nervous apoplexy, and in other similar diseases of excess of tone; whilst its hardness is inseparable from the smallness of its rhythm in the advanced pulmonary phthisis, in hysterical or hypochondriacal affections, and in many other cases of hyposthenic complaints. The

nervous chronic rheumatism, and the gout (when this attacks one or more of the internal viscera with spasmodic pain) are both also accompanied by a hard, and more or less small pulse. In all these cases, one or the other cause of the hard pulse always predominates: either the pulsatile artery is tense and rigid, or the blood is too thick, or the sensibility of the heart is much exalted, or even changed by the reaction of some local affections; or finally, all these causes concur together, and produce the highest degree of hardness of the pulse.

Thus the hardness alone of the pulse, isolated from the greatness or from the smallness of its rhythm, does not determine the nature or character of the different diseases it accompanies; it is the other variations of the pulse, that may be and are found variously combined together in a state of disease, which lead to a correct judgment whether a disease accompanied by the hardness of the pulse is hypersthenic or hyposthenic: and it is as important to distinguish when the pulse is hard and great, and when it is hard and small, as it is of the utmost consequence in practice to adapt the method of treatment to the nature of various diseases, and to

prògnosticate upon sure grounds its favourable or fatal termination.

The treatment of old persons, however, in acute diseases, requires the utmost sagacity and skill in the art ; because it is known that in these the pulse is naturally hard and in no degree great ; and as it does not elevate itself much above its natural force, even in hypersthenic diseases, the mistake may easily happen of taking a disease arising from great strength for one proceeding from weakness, and *vice versa*. The possibility of this mistake rests upon the deteriorated state of the vital powers of old persons, which are therefore incapable of being sensibly raised even in hypersthenic diseases ; for which reason it is useless to wait for the effect of observing the pulse so enlarged as to prevent our being deceived, when it is necessary to ascertain if this or that disease of old persons be of an hypersthenic character, or of an opposite nature, as soon as the greatness of the pulse is not sensible to such a degree as for us to make such a conclusion, and the hardness and tension are natural to the pulse of old people. It is rather in the acceleration of the rhythm of the pulse, and not in their

hardness or greatness, that nature indicates the cause of any danger, which may threaten the life of old persons in acute disorders of equivocal character.

The hardness of the pulse is not so alarming when it is found coupled with the greatness of its beatings in inflammatory or bilious fevers, provided these be not epidemic. The hard and great pulse, which is produced by the increase, although morbose, of the vital powers, may be instantaneously diminished by bleeding, by the beneficial effects of an emetic, or of an opening draught; and by these means of art, and by the use of acidulated drinks, the disease frequently performs its course regularly, and generally terminates favourably. Besides, it is known, that as long as the greatness of the pulse obtains in patients suffering with inflammatory fevers, nature is neither deficient in strength nor energy, and either crisis can, in this case, be effected.

For two reasons, however, the hardness of the pulse may announce the fatal termination of phlegmasiæ and acute hypersthenic fevers: one is the change, without any apparent reason, of the hard and great pulse into the small one; and the other is that of seeing, that while the pulse from great becomes small, it becomes

gradually smaller and smaller in the successive course of such disorders. In either case, the fatal issue of the disease is greatly to be feared, especially when the pulse gradually gets smaller and smaller, and when its hardness is changed for softness; for, the small and soft pulse then indicates the passage of the inflammation into gangrene. But this fatal termination of inflammatory fevers and phlegmasiæ, is more often the effect of the neglect of general and local bleedings or of other not less prompt antiphlogistic remedies than their natural result; for when antiphlogistic remedies are applied in time, and are not abused, so melancholy and fatal a termination does not generally accompany phlegmasiæ and inflammatory fevers; when, I say, their mode of treatment does not err either in this or in that excess, to which, without doubt, should be referred the cause of their severity and fatal issue.

The object of the abstraction of blood is to remove the excess of tone, which forms the apparent character of phlegmasiæ and inflammatory fevers, and not to weaken, unnecessarily and immoderately, the vital powers, by lowering, more than should be done, their sphere of activity, by means of repeated

bleedings, which, on account of the excessive loss of blood, occasioned by the direct weakening of the vital powers, induce upon the organs and all the solids their inactivity and mortification, for the want of stimulus and necessary nourishment.

But the hard and small pulse is certainly not of so unfavourable a character in the paroxysm of acute fevers, unless, as we have above said, it does not preserve its smallness and hardness in their course. The presence of the hard and small pulse does not indicate the least danger in hysterical or hypochondriacal affections, in nervous rheumatism, nor in regular gout: but its presence is of fatal augury in nervous apoplexy, in active hemorrhages of the lungs, and in acute dropsies: it cannot but attract attention in epilepsy and in the spasm of the viscera; and its presence is another fatal sign in nervous fevers, and much more so in the advanced periods of pulmonary phthisis.

ART. IV.

OF THE SOFT MORBOSE PULSE.

THE diastole or dilation of the artery, instead of making upon the organ of touch a harsh, rigid, or hard impression, like that resulting from the vibration of a violin-string, excites on the contrary a soft sensation, producing in the mind the idea of the flexibility and softness of bodies endowed with them; and it is this circumstance which has given rise to the term, soft pulse. The soft pulse often owes its existence to the state of weakness of the contractions of the ventricles of the heart, and to the somewhat full state of the arteries, which, because they are obstructed with blood, and because the weak contractions of the ventricles of the heart cannot impel this fluid with the requisite force, cannot then effect their contractions with energy; and hence arises the softness of the pulse, or the yielding of the artery to the slightest pressure of the fingers.

The fulness of the artery (whilst it forms part of the character of the soft pulse,) does not allow it to be confounded with the small pulse, in which the artery is far from the state of fulness; while the atony of the contractions of the ventricles of the heart, which concurs in the character of the soft pulse, is that which distinguishes it from the hard pulse, in which the contractions of the heart are, as has been said, on the contrary, vehement. *Mollis pulsus*, says Haller, *a parvo differt, quod arteria plena sit; a duro, quod sanguis a corde debiliter impellatur, arteriamque parum dilatet.**

In the first place, the pulse is naturally soft in young women, children, and in individuals who have received from nature a weak, fragile, or lymphatic constitution. The reason of this phenomenon is to be found, as we have before observed, in the flexibility of their arterial tunics, in the freshness of their integuments, and in the state of plethora which generally obtains in children, and especially in young women: but, in persons of a delicate or lym-

* Ibid. p. 270.

phatic constitution, it is rather the atony of the vital powers of the heart which causes the pulse to be soft. At all events, it is necessary to recall to mind the circumstance that the pulse is naturally soft in such individuals; because in case of disease, the morbose softness of the pulse, should it occur, is always calculated by the standard of its natural one.

The morbose softness of the pulse may be referred to three causes:—1st. To the plethora which causes the blood-vessels to be full of or choked up with blood. 2d. To the state of inertness, languor, or depression of the sphere of activity of the ventricles of the heart, which on that account can no longer impel the blood with sufficient force into the arteries. 3d. To the state of spungy and consequently weak tissue of some organs which may become diseased, and produce by reaction the soft pulse. In this case, are the liver, the spleen, the pancreas, the glandular and lymphatic systems, &c. The spungy nature of the tissue of these organs is not susceptible of a strong impression, or of a great alteration; the nervous system is not materially interested in it; the reaction of their

vitality is not consequently exalted in a degree sufficiently sensible, and all concur with plethora, when that exists, and with the above indicated state of the ventricles of the heart and arteries, in producing the soft morbose pulse, by which inflammations of the viscera which are spungy, or of fragile structure, are most generally characterized.

As to the character of the soft pulse, practical observation shows that its presence in the diseases of children, women, and cachectic persons, is not a bad sign; not only because the soft pulse is homogeneous to the physical constitution of their body, and therefore does not indicate therein the least danger in the state of disease; but also because their natural state is incapable of receiving violent diseases, or such as are severe or of an intense degree in strong individuals. In other words, the diseases by which the above-mentioned persons are assailed, are either hypersthenic, or of an opposite nature: in the first place, they cannot become excessively intense or serious, because of those persons the organization is not capable, as I have said, of a profound alteration; and in the second place, every physician knows that delicate, weak, and ca-

chectic individuals, are not only accustomed to a sedentary life, but are also familiarized, so to speak, with the tedious diseases of languor, with which most frequently they are assailed. Hence, it is clear, that in either case the softness of the pulse cannot be a bad omen, especially when it accords with the slightness and moderation of the other symptoms of the disease. It is, however, necessary to be observed, that whilst *cæteris paribus*, the hyposthenic diseases of children, women, and cachectic subjects, do not, for the most part, become severe or dangerous, their course is longer, and less liable to be removed by the resources of art.

The soft pulse also does not indicate danger in hypersthenic diseases of persons of a robust and strong constitution, when they perform their course regularly, and are not alarming from other symptoms. Pulmonia, hepatitis, and similar inflammations, have in fact generally a favourable termination, when not exacerbated by a bad or violent treatment; their course being rather regular, and the accompanying symptoms more frequently correspond to it than is imagined. The soft pulse, therefore, which indicates the seat and

the form of such phlegmasiæ, must of course, in these cases, be of a good augury. Thus, the change of the hard into the soft pulse, is always favourable in hypersthenic fevers, and in the above-mentioned inflammations, provided that the soft pulse always preserves the greatness, fulness, or strength of its beatings. All medical practitioners, in fact, know that this pulse gives the best hopes of a happy termination to pulmonia, when its rhythmical or beatings become more and more free and developed; because their regularity, developement, and softness, announce the concoction, and consequently the evacuation of the critical matter by expectoration, as will be seen when we treat upon critical pulses. The soft pulse also predicts the favourable termination of other acute diseases, when the progressive increase in greatness and developement of its beatings is observed; especially if the skin appears sufficiently moistened, and the tongue be neither dry nor parched. Lastly, it will be well to observe here slightly, what we shall notice more at length in our treatise upon critical pulses; viz. that the softness of the pulse united to the regularity, liberty, and developement of its rhythmical, is always a fa-

vourable sign in the approach of the crisis of the superior organs.

But, on the contrary, the soft pulse in the above-named diseases becomes a fatal sign when its softness is accompanied by the smallness, frequency, irregularity, or intermittency of its beatings: the soft, frequent, irregular, or intermittent pulse, is therefore of fatal augury in the *adynamiaë*, *ataxiaë*, and other acute hyposthenic diseases, unless nature appears disposed to bring about a critical ventral flux. The soft and small pulse is another fatal sign of an unfavourable termination of the constitutional scorbutic, or scrophulous diseases, with several other hereditary ones, of dropsy, *cachexiaë*, and many like disorders. In all these diseases, the soft pulse is produced not only by the depraved or vitiated character of the blood, which, whilst it is deficient in fibrine or the colouring substance, abounds with serum; but also by the atony of the solids, to which we must refer the cause of the circulation of the blood being slow and languid. In short, the merit of the soft pulse is relative to the successions of its other variations; the softness united to the greatness, elevation, or force of its beatings is of good augury in acute

diseases ; and the contrary when its softness is accompanied by the smallness, weakness, and irregularity of its rhythm, not less in acute than in chronic diseases.

ART. V.

OF THE STRONG MORBOSE PULSE.

THE most sensible degree of reaction or force, which the artery can exert upon the exploratory organ which presses it, constitutes the strong or vehement pulse. The increase in size of which the diameter of the artery is capable in a morbose state, as well as a certain degree of hardness of its tunics; both these effects of the force then exerted by the artery, which, as if it were irritated, rebuts, rejects, and strikes against the organ of touch, define the character of the strong or vehement pulse, which clearly appears to be not apparently different from that which results from the union of the great, and of the hard pulse. The force, therefore, of such a reaction of the artery, must necessarily proceed from the exaltation and elevation of the sphere of activity of the ventricles of the heart and arteries, as well as from the plethoric habit, and excessive ex-

citement of all the organic functions ; circumstances which we precisely observe in the human machine, in the presence of inflammatory, ardent, gastric, or bilious fevers ; in more intense phlegmasiæ, in sanguineous or hypersthenic apoplexies, in the period of irritation of one or more vital organs, and in other like phlogistic infirmities.

We may here insist upon the necessity of appreciating the morbose force or vehemence of the pulse which indicates and accompanies the above diseases, by the standard of its natural strength or vehemence, when it there exists, and which is relative to the age, sex, and condition of the physical state of the patient. In such a case, it will be necessary to subtract mentally, the natural strength of the pulse from its morbose one ; since the latter alone, and not the former, determines the excess of tone of the organic functions in which apparently consist phlogistic or hypersthenic diseases, as it results from the violent and rapid rhythmi of the arteries, and from the external appearance of the symptoms which accompany them.

This mode of appreciating the real merit of the morbose vehemence of the strong pulse, leads us to follow the medical law of propor-

tioning the different antiphlogistic remedies to the various individuals who are assailed by this or that hypersthenic disease. Thus, for example, it is not sufficient to practise the use of antiphlogistic remedies in inflammatory diseases; it is above all necessary to proportion the dose of the one or the other, or of both, to the degree of the morbose strength of the pulse, which determines the excess of tone or excitement that must be removed; and when the mental substraction above named, of the natural from the morbose strength, is not first made, the justness of this law of nature cannot be observed.

To the light thus afforded by the principle of appreciating the morbose force of the pulse by the standard of its natural one, we are, in fact, indebted for the advantage obtained in practice, of not believing, *cæteris paribus*, of like intensity an inflammatory fever in a Russian, an Englishman, and in an Italian, when the strong pulse is, in fact, equal in all three; for the simple reason that the natural pulse of the Russian is generally in the natural state stronger than that of the Englishman, and much more so than that of the Italian; and when the morbose pulse is equally strong or vehement in the state of disease, we must

necessarily conclude that the disease of the individual who has the natural pulse less strong in the healthy state, is consequently more intense and severe; the supernatural strength of the pulse, which arises from the part exceeding the natural vigour, being that which, as I have said, determines the real value, intensity or force of the disorder.

Hence, taking as our guide, the degree of the morbose strength of the pulse, which is the index of the merit or real strength of the disease, the termination of every hypersthenic disease may be prognosticated. Thus, the morbose strength or vehemence of the pulse which is contained within the limits of moderation, indicates that the disease will make its course regularly, and that the simple negative plan is sufficient in most instances, to remove the excess of tone in which the organic functions are more or less found to be in the presence of phlogistic diseases. The apprehension of an unfavourable termination may arise from the vehemence of the too immoderate pulse, which gives reason to suspect the passage of the inflammation to supuration or gangrene; but such apprehension is removed, upon reflecting that the immoderate strength of the pulse may be immediately

reduced by repeated general or local bleedings. The difficulty of finding a favourable termination to acute diseases, most often occurs in subjects of advanced age, both because the presence of the too strong pulse is foreign to the natural state of their body, and also because nature is too weak in old persons to oppose the violence and obstinacy of the disease, and likewise because antiphlogistic remedies cannot be liberally applied, or abstractions of blood repeated, as is frequently done in similarly hypersthenic diseases of young persons, or adults.

But the certitude of being able to moderate at will and easily the excessive strength of the pulse, and consequently the violence of hypersthenic diseases in young subjects, or even adults, should not allow the procrastination of bleeding, when seasonable, nor the following the practice of Botal, repeating it several times, and neglecting the precaution of sparing the remains of the vital powers, which nature should employ at the moment of the crisis, in order to resist the continued effects of the disease, which necessarily makes its course. The rule to be followed in these and similar cases is rather that of attending to the information afforded by the strong pulse, whose various degrees of

morbose vehemence nearly points out the various antiphlogistic remedies, which best correspond to the object of the indication, and the standard to be observed in proportioning the dose of them to the necessity of the case. In this manner, whilst we avoid those violent methods of cure which alarm nature, and overturn the order of its laws, we also obtain the advantage of not prolonging by dint of multiplied antiphlogistic remedies, the period of convalescence which succeeds that of disease, and which, improperly prolonged, might give rise to relapses too often fatal. Thus all the merit of the experienced physician consists in suffering himself to be guided in the treatment of phlogistic diseases, by the approximative degree of the morbose vehemence of the pulse, by which means, in proportion to the circumstances and necessities of the case, he can avail himself at one time of general or local bleedings, or other antiphlogistic remedies, and at another of the negative method, or expectant medicine of Hippocrates, when the pulse does not show itself immoderately strong and vehement, and when the organic functions are not materially altered, elevated or exalted.

Lastly, the observations to be made upon the character of the vehemently morbose pulse,

regard rather the apparatus of the other symptoms which may combine together in acute diseases ; the first is that of considering as a fatal omen of the termination of the disorder, the morbose vehemence of the pulse, when it is accompanied by convulsions, delirium, lethargy, and other unfavourable symptoms. The approach of the danger advances upon the change of the vehement and strong into the weak, frequent, and unequal pulse ; indicating prostration of the vital powers, which arises from their excessive tone, carried by the impetuosity of the disease beyond the limits assigned by nature ; and the reason of such a prognostic is found in the deteriorated state of the pulse, which invariably follows that of the vital principle, which differs not from the collection of the organic functions, and from the laws which support and govern them.

The other observation to be made is that the morbose vehemence of the pulse, when unaccompanied by a too sensible degree of hardness, is a good sign in sanguineous and hypersthenic apoplexies of adults ; because it is justly believed, that the apoplexy is not then derived from the extravasation of blood, which is usually

announced by the harshness or hardness of the pulse, and that nature preserves all her strength, in order to triumph over the disease. The case is, however, different in the apoplexies of old persons, whose strength being worn out, has not left nature sufficient energy to be triumphant; they, therefore, fall under the disease, and this fatal termination of the disorder is announced by the marked hardness and sensible deterioration of the pulse.

In general, nothing sinister happens in active or hypersthenic hemorrhages when the pulse preserves both its strength and the regularity of its rhythm. The effects themselves of this disorder, which consist in the subtraction of the stimulus of the blood, remove or necessarily diminish the exuberance of the patient's strength, and by so doing, they weaken, if not altogether do away with, the cause of the disease. The vehemence of the pulse which takes place in hypersthenic dropsies, does not destroy the hope of seeing them terminate regularly, when the cause of the disorder is not found to be an organic affection. But, on the contrary, if in dropsies of every kind the vehemence, together with the sensible hardness

of the beatings of the pulse, should increase without a sufficient reason, it would then be a sign that some organ or other of the body is inflamed, a phenomenon frequently to be observed in practice.

ART. VI.

OF THE WEAK MORBOSE PULSE.

Two essential circumstances concur in determining the character of the weak morbose pulse, the feebleness of the contractions of the ventricles of the heart, and the slightness of the efforts made by the artery in such cases against the exploratory organ. The weak pulse differs from the small one, inasmuch as the one is produced rather from the weakness of the vital powers of the heart; whilst the other is derived especially from the smallness of the diameter of the pulsatile artery, or from its inertness, inactivity or vacuity, although the deterioration of the organic functions contributes to the existence of both. Albert Haller thus expresses himself in determining the difference which exists between both these pulses. "*Quare,*" he says, "*parvus a debili parum differt, nisi quod parvitas ad arteriæ inanitatem magis et exilitatem, debilitas ad vires cordis exiguas magis spectat.*"*

* Ibid, p. 269.

Thus, therefore, the small pulse, which is indicated by the smallness of the diameter of the artery, or by its inaction, (because it oscillates and beats without energy and force,) and the weak pulse which has a direct relation with the state of inertness or languor of the ventricles of the heart, both have for their object to discover to the medical practitioner the state of weakness, the prostration of the vital powers, and the general atony, or else they follow certain organic pulses, as we shall have occasion to see in the progress of this work.

Weakness may, however, be natural to the pulse of fat, and weak persons, or those of a delicate constitution; for, although they may be perfectly free from any disease whatsoever, their pulse is nevertheless naturally weak; at all events we observe that their languid mode of existence has a certain analogy with the mode of being of certain chronic infirmities. Hence the advantage appears clear which is derived from the idea already given of the natural weakness of the pulse in cachectics, in fat persons, and all other individuals who are of a weak, delicate, or fragile constitution; for, with the help of this preliminary idea we may, in the morbose state, avoid the error of attributing the entire debility of the pulse

to the cause of the disease; whilst a great portion of it is to be attributed to the natural fragility or weakness of the body; and at the moment when it is useful, in like cases, to deduct from the morbose weakness of the pulse its natural one which may concur with it, and often does in the above-mentioned cases; the other error will be avoided; viz., that of believing more hyposthenic than they really are, the diseases of languor, to which, for reasons already shown, fat persons, cachectics, and those of delicate constitution, are particularly liable.

Thus, the knowledge of the naturally weak pulse assists in directing the mind in its judgment upon the character, and favourable or unfavourable termination of diseases in which the weak pulse is found; for, the weakness of the pulse is a bad sign in diseases of persons of a strong constitution, and of no consequence, on the contrary, in cachectic persons, and those of a weak and delicate constitution. The fact is, that persons of a strong constitution are in no wise accustomed to drag on, so to speak, a languid and wearisome existence, like that of cachectic people, or those of a delicate constitution; and consequently the former cannot, like the latter, contract a dis-

ease of weakness without the concurrence of one or more powerfully hurtful causes ; and to see the pulse of patients of strong constitution pass from the state of strength, to that of marked weakness, explains why the presence of the weak pulse is of an unfavourable import in the diseases of such individuals, and of no importance in those persons of delicate complexion, and such as are continually ailing, who easily accustom themselves to the negative state of health ; they drag on a languid and wearisome existence, and have the pulse naturally weak. Thus it is, in the comparison of the physical circumstances connected with both, that we find the reason which prevents the first from easily contracting a disease of weakness, and the latter an acute disease of excessive vigour ; a striking example of which we have in malignant epidemic fevers, which attack, with much violence, robust and plethoric subjects, and but seldom, or very slightly, weak and delicate persons, or such as are of a delicate complexion.

Hence, the more the weakness of the pulse is natural or analogous to the age, sex, physical constitution, to the spongy tissue of this or that organ, or to the kind of certain diseases,

the less is then to be feared the presence of the weak pulse. But it is, on the contrary, of sinister augury when it is not derived from the fragility of the physical system of the patient, from affections of the mind, from want, from dissoluteness, immoderate evacuations, long watchings, painful fatigues, and other similar causes. In fact, the weak morbose pulse constantly exhibits itself in malignant fevers; that is to say, in simple, compound, and complicated typhus, in passive or hyposthenic hemorrhages, in hectic, nervous or lymphatic fevers, in epidemic dysenteries, and in many other disorders which derive their existence from the lowering of the vital powers, from the general atony, or from the state of deep affection of one or more vital organs; and the more sensible the weakness of the pulse is to the touch in such disorders, the more intense may be considered their malignity and severity, and *vice versa*.

In fact the acute diseases which announce themselves by the weakness of the pulse, and which are followed by other symptoms or signs of acknowledged sinister character, are of an intense degree of malignity and violence. At that time the vital powers, and therefore their representative the medicatrix nature, failing

in energy and strength in the presence of the weak pulse, cannot succeed in overcoming the resistance of the disease, which triumphs over her salutary efforts. In one case only can the struggle be decided in favour of nature and against the baleful attacks of the disease; this is, when the malignant fever, for instance, occurs in a subject whose strength is temporarily overcome, or even oppressed by some morbose cause existing in the intestinal canal; for in this case, it is either the action of a slight purge which can remove by evacuation the material cause, as observed by Wierus, Cox, and several other eminent physicians; or it is the febrile heat, which can stimulate the tunics of the intestinal canal, to reject it from the body, or lastly, nature may herself recover from her state of depression, resume her action, and completely overcome the disease.

But the weakness of the pulse is almost always of sinister import in the epidemic fevers, which derive their malignant influence from some miasma, or any other destructive principle in the air, as is found to be the case in climates where the air is infectious, and where fevers called contagious generally predominate. The deterioration and alteration of the sensitive

powers as well as the prostration of the organic functions are more sensible in these than in the other fevers. Hence, there is but a remote hope that nature can equally triumph over their resistance, whilst it is in want of strength and energy in the presence of the above mentioned malignant fevers, indicated and followed by the profound weakness of the pulse. Frequency, irregularity, and not seldom intermittency, succeed the weakness of the pulse in the course of their progress, and then the unfavourable omen, deduced from the presence of the weak pulse, is verified. Nearly similar to this is the danger which threatens the patient in phlegmasiæ, at the moment of the passage which the strong pulse may make into the sensibly weak one; since such a passage leads us to infer their termination in gangrene; and such an opinion is strengthened by the observation of the frequency and intermittency of the pulse which succeed its extreme weakness, as well as by the sudden or unforeseen disappearance of pain from the part affected, or from the inflamed organ.

But the character of the weak pulse varies in chronic diseases of long date, because it does not there announce the least danger, whether the chronic disorders are the effect of

some mental passions ; whether they result from a disorderly way of living, or from long and painful fatigues of the mind : in all these cases the weakness of the pulse is not of much consequence, for the reason that this may cease in an instant to exist, together with the cause of the disease, and then, as long as the chronic affections prolong their course with impunity, as is frequently observed in practice, the cause cannot be powerful, nor the seat noble, nor the issue fatal. In this order of chronic diseases may be included nervous affections, hypochondria, hysteria, paralysis, nervous rheumatism, gout, and several other similar chronic affections. The same paralysis which is accompanied by the weak pulse, and renders the muscles of the part affected insubordinate to the command of volition, does not likewise threaten life when not succeeded by apoplexy, which can certainly destroy immediately the tree of life, according to the result of practical observation.

From what has hitherto been said upon the weak pulse, it follows, that in every case in which it is required to pronounce a judgment upon the character and termination of a disorder accompanied by the weak pulse, it is necessary to observe whether the natural weak-

ness of the pulse does or does not concur in augmenting its morbose weakness ; whether this is produced by a temporary cause, that is, by any passion, or by some disease ; if the atony of all the system be more or less pronounced, if the vital functions manifest themselves in proportion to the degree of intensity with their sensible alteration, and whether the character of the symptoms which accompany it, combines with the more or less sensible degree of weakness of the pulse and with the successive progress of the disease itself ; for it must be here remarked that the weak pulse is not the harbinger of the danger which threatens the patient, unless when it indicates the profound prostration of the organic functions, with the alteration or deterioration of the sensitive forces, as the great part of weakness of the pulse may be natural, and therefore may not always point out the certainty of the danger.

ART. VII.

OF THE QUICK MORBOSE PULSE.

WHEN the pulsatile artery performs its beatings in less time than usual, it gives rise to the quick pulse; and it is the greater or less degree of velocity with which it executes them, which determines the degree of its quickness. All the value, therefore, of the quick or slow pulse, consists in the short or long time employed by the artery in dilating itself, or in reaching against the organ of touch: it is called quick when the time is short, and slow when the time is long. In other words, the duration of every diastole is either more or less short, or more or less prolonged; in the first case, the pulse is more or less quick; and in the second, more or less tardy or slow.

The quick pulse differs from the frequent one, inasmuch as the one results, as I have said, from the time, more or less short, which

the artery employs to execute its dilatations or diastoles; whilst the other is produced from the shortest time which occurs between the one and the other diastole. Hence, the quick pulse has relation to the time which the artery employs in dilating itself, or in reacting against the organ of the touch, and the frequent pulse on the contrary to the time elapsed between any two of its beatings. So that the pulse of an adult may beat only fifty or sixty times in the course of a minute, and yet be quick, because the artery employs less time than usual in dilating itself, or in producing its beatings. The reason of this difference is founded in fact; for, the case occurs daily in practice, in which the artery rapidly executes all its diastoles, which form the character of the quick pulse; whilst on the contrary, the time which passes between any two of its oscillations is prolonged; and it is this prolongation of time which makes this artery perform, as I have said, only fifty or sixty beats in the course of a minute, although the pulse is quick.

Hence, it is clear that the quick pulse may be, and often is, found combined with the rare pulse, which is the opposite of the frequent one, of which we shall speak in

its place among the diagnostic pulses. The pulse, in fact, is rare and quick in ataxic, slow or nervous fevers; in the apoplexies of old people, or in dying persons. In all these cases the pulse usually acquires an extraordinary celerity, whilst it does not fail to make itself remarked and distinguished by its sensible rarity. Landré Beauvais relates the case of a person attacked by an ataxic, slow or nervous fever, during the course of which the pulse was always quick, although it never exceeded the number of fifty-six beats in the space of a minute.

On the other hand, the quickness may also be observed in company with the frequency of the pulse, a striking example of which we have in new-born infants, whose pulse not seldom performs one hundred and fifty beats in the course of a minute. The quickness and frequency of the pulse are also found united together in inflammatory fevers, in the greater part of malignant fevers of an hyposthenic character, and in a prodigious number of other similar diseases. It is certainly not incumbent upon every physician to distinguish in all cases the quick pulse from the frequent one; but every physician ought at least to observe when the one or the other, or both,

are combined with the greatness, or with the smallness of their beats ; because it is this circumstance only which can and does, in fact, determine their character, and at the same time the nature of different diseases accompanied by them : and the importance of determining in practice, when the quick pulse is accompanied by the greatness or smallness of its rhythm or beats, is in proportion to the necessity of distinguishing an hyperthemic disease from one of languor ; because the quickness united with the greatness or with the force of the beats of the pulse, is an indicatory sign of the first ; and of the second, the quickness with their smallness or weakness. *Aliqua debilitas, says Haller, pulsum celerem et debilem reddit.**

The quickness of the pulse, however, increases in the most part of febrile diseases, not less in those which attack men than in those to which other animals are subject. *Etiam animalium pulsus, says Haller, in febre increbescunt, ut in vaccarum lue a 36 ad 50, et a 38 ad 50, numerus in primo minuto adscenderit.†*

Many other enlightened observations, made

* Op. cit. lib. VI. p. 257.

† Ibid. p. 267.

by Haller, may be found in the sixth book of his Physiology ; and these are all relative to febrile diseases accompanied by the quickness of the pulse. The only inadvertency he can be accused of, is of his not having shown when the quickness of the pulse was combined with the strength, and when with the smallness or weakness of its beats ; a circumstance which defines the character of the quick pulse, and determines that of the diseases accompanied by it.

Thus, for the purpose of profiting, on one hand, by the information given by Albert Haller upon febrile diseases accompanied by the quick pulse, and of avoiding, on the other, the inconveniences which would result from his observations, were they adopted without distinguishing the true character of the quick pulse, a character which certainly varies, as I have said, as the quickness of the pulse is found combined with the strength or with the smallness of its beatings : for this purpose, we think it will prove useful to the reader to quote, in this place, the practical observations made by Haller upon the quick pulse. *In morbis omnibus*, says he, *qui febrem conjunctam habent, pulsus acceleratur, tum a nonnullis doloribus. Nam in colico morbo, etiam absque febre,*

pulsus fuerunt 100, et in doloribus parturientium pulsus continuo et plenitudine crescit, et celeritate. This, it is true, is the only case in which Haller learnedly observes, that the quickness is united with the fulness of the beatings of the pulse in the pains of childbirth, since in all the other cases, which we shall shortly produce, he neglects to point out this circumstance. *In catarrho, he continues, levissima nempe febre, centum pulsus numerat Johannes Floyer, eumque numerum et in febre intermittente confirmavit, et in universum pro febris termino habet.*

In paroxysmo febris intermittentis, in angina, et hectica febre idem pulsus numerat 120. It must here be observed that the pulse is quick and small in the access of intermittent fevers; likewise in spurious, malignant, or hyposthenic angina, and in the hectic fever; but, on the contrary, the quickness of the pulse is united with the strength in the inflammatory or hypersthenic angina. *Ego diebus liberis febris tertianæ, he adds, et in proprio corpore, inque aliis minus irritabilis indolis, reperi pulsus fere 94. Centum pulsus pro lenioris febris termino habeo. In catarrho febricula ad 108, et 113 adscendit: in febre quotidiana ad 114, in febre continua gravi, quo tempore remittit, 124; in ve-*

hementiori exacerbatione, et tamen nondum summa, 134; tantumdem in paroxysmo febris tertianæ, et ad 140 in summa exacerbatione febris erysipelacæ quæ tamen non funesta fuit. Centum et quinquaginta in febre, satis gravi, eruptoria variolarum, puella in quadrienni numeratos fuisse video. Eum numerum nunquam reperi, minus etiam pulsus 300, quos febris lethiferæ video adsignari.

*Quare observationes meæ, sæpe accuratæ, iteratæ, magis cum numeris Bryan Robison, quam cum Jeremiæ Wainewright, aut Johannis Floyer tabulis conveniunt; quorum iste quidem negat se supra 120 pulsus unquam observasse, et alibi 130 pulsus pro termino ultimo celeritatis habet; pulsusque demum 140 in moribundis numerat. Verum ego in tertiana validi juvenis facillime sanabili 134 pulsus numeravi, et aliquot ultra, ut tangens medicus numerum inire nequiret, in me ipso memini fuisse, in gravissima quidem, quæ tamen haud ultra duodecim inde horis subito ad 90 pulsus relapsa est. Eum numerum fidæ remissionis terminum esse reperi. Inde ad 80, et ad nativum numerum pulsus redit. In eruptoria febre jam excitata, ut febris a 110 ad 120, 130, 150 excrevit, ita ad 120, 110, 70, 60 rediit, cum deferbuisset.**

* Haller, Op. et loc. cit. p. 266, 267.

The increase of the quickness of the pulse, from 75 to 120, is often to be found in adults attacked by hypersthenic diseases of great intensity, and from 75 to 130 in the acute malignant fevers. This observation becomes still more confirmed by the certainty, that the severity or slighness of the hypersthenic diseases is in proportion to the degree of quickness and morbose strength of the pulse which are then found combined together: likewise the intensity of hyposthenic diseases is increased or diminished in proportion as the pulse accompanying them is more or less quick, more or less frequent, more or less small or weak. The worthy Dr. Double observes that the termination is fatal of acute diseases which are accompanied by the quick and frequent pulse; since, from the union of their causes should be inferred a greater danger. This is confirmed by Haller himself, in these words: *Cum celeritate vero parvus frequenter in periculis febribus reperitur.**

* Haller, Op. et loc. cit. p. 269.

ART. VIII.

OF THE SLOW MORBOSE PULSE.

FOR an opposite reason to that which generates the quick pulse arises the slow or tardy one: in this the artery employs a longer time than usual in operating its diastoles, the cause of which is the slowness with which the heart performs its contractions, or the defect of energy of all the organs of the circulation of the blood. The slow or tardy pulse differs from the rare one, inasmuch as the first refers to the prolonged time which the artery consumes in dilating itself, and the other to the prolongation of the intervals which intervene between its diastoles or dilatations.

As I have elsewhere observed, slowness is natural to the pulse of old people, convalescents, tall persons, and of those inhabiting northern regions. To be able, therefore, to distinguish the pulse naturally slow from the morbose one, it is necessary to revert to the true cause which produces both, and likewise to observe if its slowness is united with the

hardness and greatness of its beats, or only with their softness and smallness, because its character varies according to this circumstance. In fact, hardness and slowness are what characterize the natural pulse of old people; and whilst both variations of the pulse indicate the healthy state of these individuals, they must necessarily alarm the physician in diseases of women and young persons. Besides, the character of the slow pulse varies according as its slowness is found united with the strength or greatness, or with the smallness or weakness, of its rhythm; since, in the first case, it indicates the natural state of countrymen, mechanics, and inhabitants of cold climates; and when it is accompanied with the smallness and weakness of its beats, announces, as I have said, the period of convalescence, or else the presence of an hyposthenic disease, in case that the slowness or weakness of the pulse be equally morbose, and sensible to the touch.

Thus it always follows from an examination, that the judgment which is formed upon the morbose slowness of the pulse should have reference to its natural one. The slow morbose pulse, therefore, is not a sign of severe disease in patients of an advanced age, nor in

those of a strong and robust complexion, provided its slowness is not united either with the excessive strength of its rhythm, or with their marked smallness and weakness. But the slowness of the pulse is a bad sign beyond the circumstances mentioned, especially if other serious signs or symptoms take place in diseases accompanied by it.

The slowness of the pulse, isolated from its rarity, which takes place, as I have said, in the length of the intervals of its beats, is not alarming in the paroxysm of febrile cold, as in the developement and successive course of the fever. The slowness of the pulse shows itself not seldom in hysteria, hypochondria, and in various other nervous diseases of long standing, and does not announce any danger. But the slowness of the pulse is a fatal sign in the successive course of acute diseases; above all, when it becomes more marked, and is accompanied with the smallness, weakness, and inequality of its rhythm. The case is different, when the excessive quickness of the pulse is succeeded by its moderate slowness in acute diseases, a change which indicates the improvement of the patient, provided such a change be effected gradually, and not suddenly, which would indicate, on the contrary, the in-

direct deterioration of the vital powers. But in order that the prognostic be well founded, it is not sufficient, that the change of the quick pulse into the slow one should be operated gradually; it is also requisite that the slow pulse should acquire some degree of energy and strength.

ART. IX.

OF THE FREQUENT MORBOSE PULSE.

IN general, the pulse of any individual is said to be frequent, when it performs within a given time more beats than it does in the usual state; and whilst it performs a greater number of rhythmical, it must repeat its frequency from the shortness of the time which occurs between its beats. Thus, the pulse of an adult, which performs eighty or ninety beats in the space of a minute, instead of performing seventy-five, as usual, acquires the appellation of the frequent pulse, on the condition that its frequency is derived from the rapid transition of the time between its diastoles, dilatations or beatings.

The frequency of the pulse is relative to the age, sex, physical constitution, climate, mode of living, and lastly, to the character and severity of certain diseases which feed it, if not wholly produce it. Thus, it would be acting contrary to the principles of the art, if in the commencement and in the course of the diseases of children, young women, and

inhabitants of southern climates, no allowance were made for the frequency which is more or less natural to their pulse in the state of health; and this is the reason why, *cæteris paribus*, the pulse is more frequent in diseases of persons of the above description, and less in such as have not, like them, the pulse naturally frequent.

I have said, that the frequency of the pulse is relative to the character of various diseases accompanied by it; and a proof of which we have in practice, since we find that the pulse is more frequent in eruptive fevers, called on that account exanthematical, and less sensibly in catarrhal and intermittent ones: thus it is in the former that the frequency and celerity of the pulse are found together, a union which corresponds to the quick and frequent contractions of the ventricles of the heart, which are the effect of a double or stronger cause, as is attested by Haller in the following words: *A stimulo enim fortiori, et abundantiori, cor et celerius contrahitur, et una frequentius.**

The difficulty does not consist in ascertaining how the pulse can be at the same time frequent and quick in diseases of too great vigour, be-

* Haller, Op. et loc. cit. p. 248.

cause Haller finds the reason of it in the greater force and abundance of the morbose stimulus ; the difficulty is rather to comprehend how the frequency and celerity of the pulse can be so often combined in diseases of weakness. In fact, the pulse is quick and frequent in nervous, putrid, or malignant fevers, and in other like diseases of an hyposthenic character ; with this difference, which should be noted previously, viz.—That its frequency and quickness are found accompanied by the strength of the beats of the pulse in hypersthenic diseases, and by their smallness and weakness in those of an opposite nature. But the distinguishing one disease from another by means of the force or smallness of the beatings of the pulse, does not indicate the reason which is necessary to explain how the inflammatory state, and that of atony, which are opposed to one another, can, notwithstanding, give rise to the quick and frequent pulse. That the inflammatory state can be the cause of the above pulse, will easily be understood, by the assistance of the velocity and frequency of the contractions of the heart, which are the effect of the exaltation of its vitality, and of the violence with which the exercise of the vital functions then acts, and in which apparently consist the diseases of excessive vigour : but the

difficulty still presents itself of knowing how the state of languor, or of atony, can produce the same phenomenon ; that is, the frequency and celerity of the rhythmi of the pulse.

In order to understand this, it is necessary to recall to mind the physical state of children, whose pulse is quick and frequent, although they are neither robust and strong, nor even affected, in the natural state, by diseases of excessive tone. But it may be objected, that children have the heart very excitable ; and that the exquisite excitability of that organ and of the arteries in the period of childhood, is the cause of the frequency and quickness of the pulse. Now it is known that the excitability of the organs is increased in proportion as their state of weakness gains ground ; the weaker the various organs of man become, the more the excitability is accumulated. It is, therefore, the great sensibility of the heart and arteries, which obeys the slightest stimulus of the blood in the state of weakness, which accelerates and renders frequent the contractions of the heart, as well in the period of childhood, as in the state of atony of adults who are afflicted by diseases of languor. In fact, the ventricles of the heart of children and of weak adults, not

being able to propel and dispatch, in each systole, a sufficient quantity of blood to the different parts of the body, on account of the state of languor of the vital powers; make up for it by the greater frequency and celerity of their contractions, which, on account of their obliging the arteries to repeat their systole and diastole with a like frequency and velocity, necessarily occasion the frequency and celerity of the pulse, which accompanies, as I have said, nervous, putrid or malignant fevers, and various other like hyposthenic diseases.

In other words, in the state of weakness, all the nerves show themselves most sensible to the least stimulus; the heart and arteries oscillate more expeditiously in consequence of the slightest action of the blood, as I have before observed; all the tonicities or sensibility of the heart, together with the vitality of all the living system, manifests itself externally, and becomes increased; and then we cannot fail to find in patients suffering under diseases of weakness, the same effect which naturally arises in the economy of children; that is to say, the acceleration of the contractions of the ventricles of the heart and arteries: this is the means to which nature herself has recourse, in order to supply, as I have said, the

want of their ordinary and necessary strength by the accumulation of their excitability, and the frequency of the contractions resulting from it: in this way nature succeeds in multiplying the dispatching, if I may so express myself, in less time, of the different columns of blood, through the different parts of the body. In support of this explanation, we may adduce the authority of Haller, who says—*Ergo pulsum frequentem facit, unaque proculdubio celerem, magis irritabilis cordis indoles, ex qua fit, ut ab unda sanguinis minori recepta, cor tamen efficaciter, ob innatam quasi pruriginosam teneritudinem, ad contractionem sollicitetur.**

It may therefore be affirmed, not without some foundation of reason, that the quickness and frequency of the pulse derive their existence from two entirely opposite and different causes: they may proceed, as we have observed, from the state of excessive vigour, when the vital powers perform their functions with a certain degree of violence or intensity, and they may also be merely the effect of the excessive sensibility of the heart and arteries, as is observed naturally in children, and morbosely in adults affected with diseases of weak-

* Haller, Op. cit. lib. vi. p. 248.

ness, in which the celerity and frequency of the contractions of the heart and arteries supply the defect of their strength.

Now, who does not perceive how ill-founded is Boerhaave's opinion, who, together with his followers, maintains, that the frequency or celerity of the pulse, or both together, constitute the characteristic sign of the fever? In the first place, it does not appear from observation, that the quick and frequent pulse is, as Boerhaave presumes it to be, the distinctive sign of the fever, as such a pulse may belong to various other diseases; and does, in fact, belong to maladies also of a different nature, as has been already observed in treating of the quick pulse: nor are instances rare of fevers of a malignant character, which are indicated rather by the smallness, weakness, and slowness or rarity of the beatings of the pulse.

Hence, it is clear, that in order to determine justly the character of the frequent pulse, and to ascertain the value of its presence in the various diseases which it accompanies, it is necessary to investigate the source from which it arises, whether any foreign cause concurs in producing it, and whether its rhythmical beats are strong or weak, great or small,

equal or unequal ; because it varies its character according to all these circumstances. The frequency, united with the strength and greatness of the beats of the pulse, is a distinctive sign of phlegmasies and of inflammatory fevers ; and the same frequency of the pulse indicates the presence of a disease of languor, when on the contrary it is accompanied by the smallness or weakness of its beats ; and lastly, the frequency of the pulse may characterize the period of childhood, in which it takes place, in consequence of the natural weakness of the contractions of the child's heart and arteries.

There is, however, every reason to fear the fatal termination of acute diseases of an hypersthenic nature, when the frequency and excessive force of the beatings of the pulse increase more and more, and without an apparent cause, in the course of phlegmasies and inflammatory fevers ; because then, when the elevation and excessive frequency of the rhythm of the pulse do not arise from the exaltation of the vitality of an organ deeply attacked by some local affection, there should always be some doubt, at least, respecting the malignant character of this or that kind of disease, by which it is followed. Nature, as

we shall observe in the treatise upon critical pulses, cannot favourably effect either crisis, when the malady is accompanied by a degree of violence or intensity superior to its strength; and when the frequency and strength of the *rhythmi* of the pulse exceed the limits of moderation, there is every thing to fear, especially if the pulse maintains itself in this manner, notwithstanding the application of every antiphlogistic remedy, with the view of moderating the rapid course of the circulation of the blood, and consequently of preventing the progress of the inflammation towards supuration or gangrene.

In like manner the too frequent pulse is alarming when accompanied by the smallness or weakness of its *rhythmi*; because it then accompanies adynamic, ataxic, mucous or putrid and malignant fevers, which generally terminate unfavourably. A like judgment may be formed of the issue usually attending spurious, false, or hyposthenic phlegmasies, and passive hemorrhages, in the presence of the too frequent, small, or weak pulse, especially when succeeded by inequality or intermittency.

But it is only in the access or paroxysm of acute diseases that the frequent pulse is not

alarming, because its frequency may be seen diminishing every moment during their successive course, in which the greatest danger certainly exists when the frequent pulse still maintains itself. At all events, the precaution is most important, of not confounding, in the course of acute diseases, the frequency of the pulse, which is the effect of the irritation of the morbose cause, with that which takes place in the work of nature or of the crisis ; in this phenomenon, the frequency of the pulse is a favourable sign, and an unfavourable one in the other, especially when the symptoms of the disease appear more exacerbated than they ought, which gives us to understand that the frequency of the pulse in this case is rather the effect of a morbose irritation.

The increase of the frequency of the pulse in the morning, and not towards the evening, which would be more regular, is also an unfavourable sign in acute diseases ; for the disease, in that case, presents itself to the physician, redoubling in its periods, which are relative to the exacerbation of the disease : and when the increase of the frequency of the pulse in the morning is owing to the disturbed sleep of the over night, and consequently to the want of complete repose, it is always a bad

sign, because it shows that the vital powers of the patient are not sufficiently restored by the night's rest, especially if the intensity of the other symptoms of the disease increases with the frequency of the pulse.

Lastly, the frequency of the pulse is also to be feared in the period of convalescence, for its continuance is, if not wholly mischievous, at least suspicious ; both because the frequent pulse may be kept up to some local affection, which leads to fatal consequences, and because the patient is much exposed to a relapse, at a time when his strength is exhausted and weakened, in which case the new disease always becomes worse than the old one.

ART. X.

OF THE RARE MORBOSE PULSE.

FROM the longest time which passes between the diastoles of the pulsatile artery the rare pulse is produced. Thus, the pulse of an adult which performs sixty, fifty, or even forty beats in the space of a minute, instead of effecting seventy-five, which it does in the natural state, differs not from the rare pulse, when the condition already mentioned concurs with it, which derives, so to speak, the diminution of its rhythm in a given time, from the length of the intervals intervening between any two of its rhythm, and not from the prolongation of the time which the diastoles of the artery employ in the tardy or slow pulse, as we have remarked above.

The rare pulse, which represents the reverse of the medal of the frequent one, must necessarily arise from the obtuse tonicity of the heart and arteries, from the state of slowness of the course of the circulation of the blood,

and from the defective or exhausted excitement of the physical system of man. Daily observation leads us to this deduction respecting the origin of the rare pulse; for we see that the pulse is naturally rare in old people, in whom are more frequently found the obtuseness of the tonicity of the fibres of the heart, the wasting of the vital powers, and the excitement deteriorated by the long use of life. Thus in proportion as any individual approaches the physical state of old age, his pulse becomes in proportion more rare, either on account of his weak and fragile constitution, or from some other cause.

Another proof that the rarity of the rhythm of the pulse depends upon, if it is not entirely derived from, the above-mentioned causes, is found in the examination of the physical circumstances of those animals which have one ventricle in the heart, and whose blood is consequently cold; for it is known, that the state of torpor of the fibres of the heart and arteries of such animals, which does not allow their obtuse sensibility readily to obey the stimulus of the blood, produces also the rarity of their contractions: all the organic functions of serpents, fishes, and other cold-blooded animals,

are naturally exercised without energy and with little strength, and the rarity of the *rhythmi* of the pulse, which depends upon them, is so marked that the observer must arm himself with patience, in order to wait till he feels upon the organ of touch the dilatations or beatings of the ventricle of the heart and arteries, beatings which slowly succeed each other, and after very long intervals of time; also because their blood does not stimulate with energy the obtuse tonicity of the heart and arteries; and the older the animal, the more apparent to the senses are the languor of life, and the rarity of the *rhythmi* of the pulse.

This mode of existence of the cold-blooded animals, resembles in no slight degree the physical state of a man when affected with diseases of languor, although he has a heart with two ventricles and is a warm-blooded animal; and the degrees of resemblance between the torpid state of cold-blooded animals and the languid state of a man advanced in years are still greater, because the fibres of the heart and arteries of the latter have but little contractility, and are sensibly worn out and deteriorated in old age, and in diseases of great

weakness ; the *venæ cavæ* discharge but little blood into the right auricle of the heart, where, consequently, such a fluid rarely arrives. Haller, treating upon the rare pulse, thus expresses himself: "*Facile intelligitur rari pulsus causas contrarias esse causis pulsus velocis ; nempe cor minus irritabile, aut diminutum stimulum, a quo irritatur. Rarus ergo in universum pulsus senis, aut animalis vetuli, rarus animalis magni, rarus hominum, quos phlegmaticos vocamus, quibus cor minus irritabile, totaque nervorum universitas surda magis sit ad stimulos. Deinde, per eadem, rarum pulsum esse apparet, quando minor copia sanguinis cordi remittitur.*"*

But the rarity, which is natural to the beatings of the pulse of the inhabitants of cold countries, and of many other individuals of equal robustness, is evidently different ; this kind of rarity of the *rhythmi* of the pulse forms an exception to the general rule of deriving it from the obtuse tonicity of the ventricles of the heart and arteries, as well as from the wasting of the nervous strength, or from the defective or worn out excitement of the human machine. The rarity of the beat-

* Haller, Op. cit. lib. vi. p. 254.

ings of the pulse in the inhabitants of cold climates arises, on the contrary, from the vigorous strength with which the ventricles of the heart send forth and despatch, in every systole, so much blood to the different parts of the body, that they do not feel the least necessity for repeating their contractions with frequency, as do the ventricles of the heart of children, and of patients deprived of all strength, which in this manner supplies the want of the necessary force, which these latter do not, like the former, possess, of impelling, in every systole, considerable columns of blood to the different parts of the body. Guided by this view of the different causes of the various kinds of rarity of the beatings of the pulse, we proceed to the knowledge of the character of the rare morbose pulse, as an indicative symptom of various kinds of diseases.

The rare pulse generally indicates the presence of malignant hyposthenic fevers, pituitous and exanthematic diseases, suppressed by defect of natural strength, or in consequence of a wrong treatment. The rare pulse is also another symptom of the slow nervous fever, of inflammations which terminate in gangrene, and also of chronic diseases of long standing,

and of not a few organic affections, in which it performs the office of a secondary sign. Its presence is constant in the apoplexies of old people, in persons weakened by severe illness, by deep affections of the mind, by long abstinence, and painful fatigues, or by that species of apoplexy which is the effect of the oppression of the cerebral mass, arising from extravasation either serous or sanguineous, or from a great degree of atony of the nervous system.

Hence, the rare pulse is of a bad character, or at least its presence is a sinister omen. There are two especial circumstances which determine its character in a positive manner: the first is, that of observing it in the diseases of those persons who have not in a healthy state the pulse naturally rare, as it would be in children, women, and the inhabitants of southern regions; and the second respects the rarity of its beatings, accompanied either by their smallness or by their weakness. In this case the rarity of the *rhythmi* of the pulse is an object of alarm, as it must necessarily announce the fatal termination of the diseases which it usually accompanies. And we have a proof of this in the frequent occurrence of the rare pulse arising from organic affections; but

in the diseases of old persons, and of the inhabitants of cold countries, it does not indicate great danger, because the rarity of its beatings is not wholly derived from the morbose cause.

The rarity of the rhythmi of the pulse, when it is marked in the apoplexies of adults, becomes an alarming sign; as well because it may arise from a principle of alteration of the delicate and fine tissue of the cerebral organ, as because it may be derived from the exhaustion of its vitality; and in either case the patient's death is certain. Its presence is also a sign of death, in the extravasation which takes place in the thoracic cavity, especially when the rarity of its beats is succeeded by the smallness and inequality of them.

In proportion as, in acute diseases the intervals which occur between two beatings of the pulse are more and more prolonged, so does the danger which threatens the patient's life increase. When the pulse of a sick child gives sixty or seventy beats in the course of a minute, it cannot but be ominous of a fatal termination. The same is to be observed of the acute diseases of adults, when the pulse does not perform more than forty or forty-five

oscillations in the same space of a minute, unless the patient be an inhabitant of the North. The union of the rarity of the pulse with the smallness, weakness, and inequality of its rhythm, is always fatally ominous in acute diseases, as it is the immediate effect of the almost complete exhaustion of the vitality of the fibres of the heart, followed or preceded by the prostration of the vital powers ; a circumstance which is every day observed in malignant, ataxic, pituitous, and adynamic fevers, which usually predominate in southern climates.

The rarity of the rhythm of the pulse, which increases, instead of diminishing, in the treatment of chronic diseases, notwithstanding the use of various remedies, must necessarily show the inutility of them, especially when they are suspected to be fed by some local affection, and when the patients live in too damp or too cold a climate. In two cases of acute diseases, the rare pulse may be a favourable omen ; in that of certain diseases of an hypersthenic character, when its rarity gradually succeeds the excessive celerity and frequency of the pulse, from the effect of the plan of cure, or by means of a crisis ; and in

that of certain acute diseases, in which the rare pulse becomes gradually elevated.

In the above-mentioned cases the presence of the rare pulse announces the removal of the danger; and the reason of this practical observation is found in the regularity which the organic functions then acquire, and in the improvement of the nervous powers, which discovers itself to the observation of the physician by means of the elevation of the rare pulse, which then rather arises from the regularity of the vital functions. Lastly, the third case, in which the rare pulse is considered a favourable omen, takes place in certain chronic diseases, when, after the employment of the means of hygiene, the intervals which occur between its beats are found to become gradually shorter; and that from being small and weak, those beats become proportionately larger and more elevated; for such an improvement of the pulse must necessarily result from the successive elevation of the vital powers.

ART. XI.

OF THE EQUAL AND UNEQUAL PULSE.

THE equality of the pulse, which is generally an excellent sign in diseases, must be referred to the uniformity of the efforts or reactions made by the artery against the organ of touch, in the examination of the pulse. Besides the beatings of the artery succeeding one another in equal times, they also preserve, throughout the whole examination, the same degree of greatness or smallness, of hardness or softness, of strength or weakness, &c., according as the pulse is great or small, hard or soft, strong or weak, &c.: so that in the equal pulse there concur three peculiarities,—the uniformity of the times employed by its diastoles; the uniformity of the intervals which take place between them; and lastly, the uniformity of strength with which the pulse pronounces its beats. The pulse is generally equal in the healthy state, because all the functions of life are then exercised regularly, and all concur in

one sole object ; viz., the equilibrium of all the partial lives. Here, on the other hand, we do not include those cases, in which the pulse of certain individuals is accustomed to be naturally irregular, these cases being so many exceptions, and not rules, for our guidance in the progressive road of science. This general idea of the equal pulse is the more necessary, as our present object is to become acquainted with the unequal one.

The inequality of the pulse has relation, in fact, with the unequal times which its diastoles employ ; with the intervals also unequal which take place between them ; and finally, with the inequality of its beats, as to their strength or weakness, greatness or smallness, &c.—Hence, whether one or more diastoles be smaller or greater, harder or softer, stronger or weaker than others ; whether one or more diastoles employ more time than the others in producing themselves ; whether some of the intervals occurring between them are longer or shorter than the rest ; lastly, whether all these irregularities concur together, in all these cases the pulse is called, or is unequal.

The inequality of the pulse is inseparable

from a certain disturbance of the organic functions, a disturbance which may be momentary, or more or less profound and continued: the disturbance is momentary which is found in the exercise of the organic functions by means of the affections of the mind, of whatsoever nature, or also from the salutary efforts which nature usually concentrates in the inferior organs, for the purpose of terminating acute diseases, by means of this or that crisis; while the permanent disturbance is that which arises from organic affections, or from chronic or acute diseases. As soon as any of the above-mentioned causes alters the order of the relations which the various organs of man preserve in the state of health, there immediately results a disturbance in the organic functions, which is the direct cause of the inequality of the pulse.

The inequality of the pulse, when it is not produced by the affections of the mind, or by the salutary efforts concentrated, as we have before observed, by nature in the inferior organs of the body, in order to produce this or that crisis, is always, in other cases, of unfavourable augury; for, whether the unequal pulse announces organic affections of the

heart, of the arterial trunks, &c. ; whether it indicates the presence of an acute disease, or whether it accompanies a chronic disorder ; in all these cases the danger which threatens the life of the patient is certainly alarming ; with this difference, that the unequal pulse is not so alarming in chronic as in acute diseases, and much more in organic affections, in which the disturbance of the functions is kept up by the alteration of the structure of this or that vital organ ; and its inequality, whilst it arises, in the majority of chronic diseases, from one sole cause, and exhibits there a kind of regularity ; results, in acute diseases, on the contrary, from several causes, which usually concur ; and it is also for the most part variable, inconstant or irregular ; an irregularity, which may be equally referred to the serious disorder of the different functions of the various organs, which then are more deeply affected, and to the alteration of their relations, by which they are sensibly influenced.

The regularity of the inequality of the pulse which generally distinguishes the chronic from acute diseases, in which latter their regularity is wanting, consists in the circumstance that the inequality of the pulse always

falls upon the same oscillation or beat, and *vice versa*. Thus, admitting, for example, what is frequently observed in practice, that the artery employs more strength or more time in performing either the ninth, the twentieth, or any other determinate dilatation or beat, and less strength or time to perform the rest; admitting that this or any other inequality falls upon the same rhythmus or beat, its inequality in the supposed case must necessarily be allowed to be regular. So that if the regularity be applied to the strength or to the time constantly employed by one or other dilatation of the artery, it may also be applied to the hardness, softness, or any other variation or modification of the pulse; for, when this or that variation is constantly observed in the fifth, for instance, sixth or tenth, we are always justified in calling this inequality *régular*: in contradistinction to the other inequalities of the pulse, because they are observed sometimes in the third, at others in the seventh, and at others in the thirtieth, or even in any other oscillation; and precisely because they are not constant, they are properly called *irregular inequalities*. And the observing of this dif-

ference is of no small importance ; because, *cæteris paribus*, irregular inequalities, which do not preserve any order or period, are more to be feared than the regular inequalities.

CONCLUSION.

THE prognostics which we have hitherto deduced from the character and state of the different diagnostic pulses, are supported by the light afforded by the combination of the simple diagnostic pulses, if so they may be called, because these are scarcely ever found isolated during the state of disease. In fact, at one time it is the strength of the pulse which is found united with the hardness, quickness and frequency of its rhythm; at another it is the smallness which is accompanied by the weakness and rarity of its beatings; at one time it is the frequency of the oscillations of the pulse, which combines with their weakness and inequality; at another it is the slowness which is associated with this and that kind of pulse. In short, the combinations to which the pulse is subject are of such a nature and so variable, that it would be a waste of time to endeavour to maintain the existence of simple diagnostic pulses, whilst these are observed in the morbose state, united and combined at one time two and two, at another three and

three, and sometimes in a manner still more complicated. And if nature had disposed otherwise, we should certainly be deprived of the advantage of knowing the intensity of the different diseases, of foreseeing their termination, and of following the right method of attacking them with simple or with compound remedies, according to the judgment pronounced by Nature herself, by means of the combinations of the various diagnostic pulses, sometimes in one, sometimes in another manner.

In fact, it is certain from observation, that in proportion as diseases advance, and become more intense, the pulse is more compounded or complicated. Thus, the vehement or strong pulse, which indicates, as we have said, the presence of phlegmasies or inflammatory fevers, never fails being accompanied by the quick, frequent and hard pulse; and it is precisely its complication, or combination with the quick, frequent and hard pulse, which enables us to form a judgment of the strength, severity, or intensity of the hypersthenic diseases which it accompanies. When the strong pulse is thus complicated, the reason is easily discovered why the life of the

patient must be more or less compromised, according as the strong pulse is itself more or less complicated ; because the union of several diagnostic pulses naturally indicates the assemblage of several morbose causes, or that the disease is compound or complicated.

The severity and intensity of acute diseases of hyposthenic character, as well as of chronic disorders, are also to be deduced from the complication of the weak pulse with the small, or even from both these pulses with the slowness, rarity, and often with the inequality of their beatings. This concourse or union of diagnostic pulses enables us to foresee death in pestilential and yellow fevers, in the spurious peripneumonia, in gangrene, in sphacelus, in gangrenous angina, and in many other similar diseases ; for, the more complicated the weak pulse appears, the greater in proportion must be the weakness of the vital functions, or more causes, and morbose phenomena must necessarily concur in them ; and when the inequality or the intermittency of the pulse is of the number of those variations or alterations which usually combine together with the weakness of its rhythm in the above-mentioned cases, imminent is then the danger which threatens the pa-

tient's life, and fatal must be the termination of the disorder, unless the intermittency or irregularity of the pulse announces the arrival of critical or ventral fluxes, or unless it be the effect of the salutary efforts of nature.

To the above-mentioned concourse of such diagnostic pulses immediately succeed various other sinister symptoms; among which the act of the patient of removing his arm from the physician's hand, at the moment of the examination of the pulse, his convulsions and involuntary motions, no longer allow any hope of saving him from the grasp of death.

These, therefore, and like complications of the diagnostic pulses, have already served, and still do serve, as a guide to the physician well acquainted with his art. The following are the results of practical observations, left upon this subject by various eminent physicians, in the form of aphorisms.-

1st. If the pulse, from being small, becomes suddenly great, without the strength of the patient being improved, it is a sign of death in lethargy and apoplexy, according to the observations of Baglivi and Wapfer.

2d. The change of the rare and slow pulse into quick and frequent is a favourable sign in ataxic fevers and hyposthenic diseases.

3d. The softness and rarity which succeed the excessive hardness and frequency of the pulse in acute hyposthenic fevers, is an excellent sign.

4th. According to the observation of Actuarius, the elevated, vehement and quick pulse announces the commencement of a disease in one or more vital organs; and the small, frequent and weak pulse indicates, on the contrary, the long duration of a disorder, which finally succeeds in impoverishing and overpowering the vital powers.

5th. The thinness, frequency, and hardness of the pulse show the state of irritation, or crudity, as it is called by medical practitioners. If the pulse continues thus in the successive periods of acute diseases, after the epocha of the concoction, it is a sign evidently unfavourable; for it is then supposed, that the crisis has not taken place there, or that, if it does take place subsequently, it will not be true or salutary.

6th. The frequent, small, irregular, and thin pulse, whilst it generally indicates the concurrence of spasm, irritation, and weakness, is also the worst sign in pestilential fevers, in typhus, in spurious angina, in false peripneumonia, and in epidemic dysenteries.

7th. The sudden change of the great and full pulse into the frequent, small, thin and irregular pulse, is a fatal sign in acute diseases.

8th. The greatness and fulness which succeed to the smallness, weakness, frequency, and irregularity of the pulse, is a sign undoubtedly favourable in acute diseases.

9th. The pulse which vacillates and changes its form every instant, is always a fatal sign. This vacillation, when it exists, is observed at one time strong, at another time weak, at one time rare, at another frequent, at one time quick, at another slow: when the pulse thus vacillates and changes, it is a sign that the pericardium, or the heart, or even both, are affected by inflammation.

10th. When the beating of the pulse becomes very sensible throughout the whole of the arterial tree, in the presence of acute diseases, it is an unfavourable sign, because such a phenomenon arises from the deep and general inflammation which is precisely indicated by this sensible beating throughout the whole arterial tree.

11th. The frequency, weakness, and inequality of the pulse is an unfavourable sign, as it

indicates the organic affections of the breast, according to Hoffmann's observations.

12th. The smallness, rarity, and weakness (approaching to insensibility) of the pulse, is an unfavourable sign, especially in syncope.

13th. The pulse which grows weaker, proceeding from the greatness to the insensibility of its oscillations, is the worst sign, as it indicates the successive exhaustion of vitality.

In this manner, from the knowledge of the signs which result from the various combinations of the different diagnostic pulses, may be seen the degree of intensity, the strength, the severity, or the slightness of acute and chronic diseases. This knowledge, when seconded by pathological anatomy, which exhibits the injuries of the various organs and systems, and when accompanied by the analysis to which every disease should be subjected at the bedside of the patient, cannot but impart greater strength and solidity to the diagnosis, prognosis, and treatment of the different diseases of the human body. This is certainly the most useful object of the examination of the diagnostic pulses.

SECOND ORDER

OF THE

ORGANIC PULSES IN GENERAL.

FROM the researches already made in the first part of this work, respecting the relations which closely unite together the various organs and systems with the circulation of the blood, we deduce the origin, foundation, and justness of the principles upon which the doctrine of organic pulses is firmly established by nature.

The reader will recall to mind the result of those researches, because it is not our intention to notice here the weakness of such as erroneously assert that the doctrine of the organic pulses is nothing but the produce of imagination, or at most the offspring of mere probability; also, because it would be a fruitless loss of time to re-produce all the arguments, which we have adduced, more at length, in the above examination.

And when we observe, with the immortal Galen, that the affection of a part or of an organ causes variations in the motion of the arteries, and therefore in the beatings of the pulse, does it not confirm the foundation and the existence of organic pulses? *In parte aliqua*, says Galen, *licet affectionem cor non sentiat, arteriarum motus variare posse*.^{*} An evident proof of the justice of organic pulses, results from the existence of the system of excitability introduced by Brown, which, as every one knows, unites closely together all the various organs of man. Rega, Bichat, Cabanis, Richerand, and many other eminent writers, treat at length upon the reciprocal consent which places in a sphere of relations all the different parts of the body. “L’ensemble, le concours de toutes les vies particulières ou facultés organiques,” says Fouquet, “excitées périodiquement et successivement par le même principe, établit le cercle d’actions ou de phénomènes qui constituent ce qu’on appelle la vie en général.”[†]

^{*} See Galen, lib. iv. de præ sagit. ex pulsib.

[†] Fouquet, Op. cit. p. 60. Baillou de Calcul; Struthius de art. Sphygm. etc.

“ Les vaisseaux,” says Dumas, “ ont leur centre dans le cœur, comme les nerfs ont leur centre dans le cerveau. L’un exerce sur les parties auxquelles il envoie le sang, la même influence que l’autre sur les organes dont il entretient le sentiment et la vie. Chacun de ces deux centres communiquent entre eux, et avec le reste de la machine animée par l’entremise des nerfs ou des vaisseaux.”*

But without too great a deference to the authority of those luminaries of the medical art, who teach us to respect the relations which place in a reciprocal dependance the organs and the functions of man; and without also attaching ourselves, as others do, to the general consideration only, that every organ is composed of blood and lymphatic vessels, of nerves and cellular tissue; we find in a rapid examination of the laws which govern the exercise of the various functions, the origin, foundation, and justness of organic pulses.

Even a slight examination of the mechanism, laws and object of the function of respiration, will show us the sufficient reason of the pectoral pulse; for the influence which the ex-

* Dumas, *Op. cit.* tom. 2, p. 359.

ercise of respiration has upon the improvement of the qualities of the blood, which directly elevates the sphere of activity of the heart and arteries, is so connected with the healthy state of the various organs and systems, that the endeavour would be fruitless to maintain, in the presence of the affections of the aëreous organ, (which performs the function of respiration,) that the circulation of the blood must not change, together with the functions of the heart and arteries, in a manner conformable to the character and state of the said affections; the more so as this physiological reasoning is confirmed by practical observation, as we shall have occasion to notice when treating of the pectoral pulse.

Proceeding to the analysis of the assimilation of nutritive particles to the tissue of different organs, which is effected by means of the circulation of the blood; we gain a true knowledge of those relations which unite that function with the various organs; relations which give rise to the different organic pulses, as often as they are altered by the different affections to which the various organs of man are subjected: And who is there that would maintain that the various organs might become diseased without communicating the

impression of their affections to the system of the circulation of the blood, and therefore to the heart, the arteries, and to the pulse? To confirm us in the certainty of this truth, practical observation may be adduced; for we see at the bedside of a patient, that in proportion as this or that organ is affected by a local disease, the pulse never fails likewise to manifest its existence, sometimes by one and sometimes by another mode of beating, a mode which is the sign, the division or distinctive character of the various organic pulses.

Prosecuting the same subject in the examination of the various secretions, which are effected by particular organs through the instrumentality of the circulation of the blood; we also find the reason which no longer allows us to believe that the secretory organs cannot alter the course, and disturb the order of the circulation of the blood; whilst they are out of order, or sensibly affected with local diseases, and whilst their functions are altered in proportion; functions which, as it has been demonstrated, are intimately connected with the circulation of the blood, which puts them in exercise, and causes them to operate by infallible and necessary laws. The organic law, therefore, which makes the circulation of the blood,

and consequently the heart, the arteries and pulse, to follow the fate and mode of existence of the various affected or diseased organs, is conformable with the plan of nature. “*Chacun des actions organiques individuelles,*” says Fouquet, “*doit modifier d’une manière particulière la circulation.*”*

Now who can avoid the necessity of admitting, with many other learned writers, the existence of organic pulses? If every organ receives the elements of its vitality, of its excitement and of its physical strength, from the red blood, which nature causes to circulate expressly in its tissue, in which the elements of its existence are distributed throughout the round of its partial circulation; if every organ is in a strict union with the heart, the arteries, and the functions which they all exercise; if this is so, how can it be asserted that the various affections of different organs are not capable of producing, or of causing, in the course of the circulation of the blood, as many alterations; or of preventing such a fluid from circulating, as does circulate in the natural state? “*Semblable au mouvement d’un vaisseau,*”

* Fouquet, *Op. cit.* p. 60.

says the celebrated Bordeu very ingeniously,
 “ qui fend la mer à pleines voiles par un vent
 “ favorable, et qui est aisément dérangé dans
 “ sa course par les changemens que le vent
 “ et les cordages peuvent faire dans l’effet des
 “ voiles ; le pouls est de même troublé dans sa
 “ marche dès que quelque organe du corps
 “ fait un effort, une compression, un tiraille-
 “ ment extraordinaire.”*

As to the variety of the organic pulses, that results certainly from the various construction of different parts of the body ; from the various calibre and number of the nerves and blood-vessels, which are distributed, and appear disposed in so many varied ways ; from the particular mode of living, and feeling of the organs ; from their specific excitability ; from the different degree of activity, and also from the greater or less disposition to inflammation : add to which, the further consideration, that every organ has a partial circulation, which communicates with the general one, and the circumstance of exercising itself with greater or less activity has a direct influence upon the character of the affections of the organ, and

* See Bordeu, *Rech. sur le Pouls*, p. 266.

upon the state of the pulse; that every organ becomes out of order in a manner peculiar to its construction; that all its actions then become specifically and proportionately altered; that its alterations disturb the partial circulation, and hence the general one, in a manner always distinct: which was also observed by the learned Dumas, for he says, “ *Lorsqu’une petite partie du sang en circulation s’arrête, toute la masse est bientôt dérangée;*”* and that the disturbance, confusion, or alteration of the general circulation must, of course, proportionately communicate its effects to the heart, arteries, and therefore to the pulse, which constitutes a part of, and is dependent upon them.

The doctrine of organic pulses, therefore, which gives a reason for the reciprocal correspondence of the local affections with organic pulses, which announce their existence, together with their peculiarities, is true, rational, and of the utmost importance in medicine. The celebrated Domenico Cirillo, to whose understanding this branch of science appeared neither strange nor factitious, refers also the cause of

* Dumas, *Op. cit.* Tom. 2, p. 312.

different organic pulses to the various character of partial actions ; to the different figure and construction of the organs which exercise them, and also to the various sensations which they experience in the morbid state. "*Animadvertendum*," says he, "*itaque quod corpus humanum nervis, musculis, venis, et arteriis adeo compositum sit, ut musicis instrumentis merito comparari possit ; quandoquidem partium actiones ut chordarum toni magnopere inter se differunt, quod quidem pendet a figura variisque sensationibus, diversaque structura.*"*

Lastly, if it be inquired whether the ancient physicians were or were not acquainted with the organic pulses ; we have every reason to suppose that Galen was by no means a stranger to them. This opinion is deduced from the following facts :—In the first place, it is related that Galen, examining the pulse of the Emperor Marcus Aurelius, who was ill, declared the disease of that prince to be an affection of the stomach. On another occasion, Galen having been consulted by a Sicilian physician respecting his disorder, said, that the real disorder was not, as he imagined, a pleurisy, but

* See his Tract. *de Pulsibus*.

an affection of the liver. On the other hand, no direct proof is found in his works, which leads us to presume that Galen was acquainted with the individual characters of the different organic pulses.

A similar opinion may be gathered from what Actuarius has left written in his work, *De Methodo Medendi*,* in which he truly says, that it may be ascertained from the pulse, whether it be the liver, the spleen, the right or left kidney, the bladder, the intestinal colon, or the stomach that is attacked by inflammation; he does not fail, however, to exhibit, in the work quoted, the description of different organic pulses. Actuarius, however, is the first who advances, that the pulse of the pain, which arises from the affection of the principal organs, shows itself elevated, vehement and quick, in the beginning, and then becomes small, deep, frequent and languid, in the course of the pain, especially when it has begun to weaken the vital powers.

Zecchius interested himself much more than his predecessors in the study of organic pulses; for, whilst he shows, in his work *de Pulsibus*,

* See Op. cit. lib. i. cap. ix.

that it is the knowledge of the pulse which enables the physician to judge of the state of various diseases, and to particularize the diseased parts of the body ; he does not fail to explain, at the same time, the various kinds of organic pulses, and the description which he gives of the pectoral pulse is particularly deserving of being read and studied.* He has not however pointed out the character of various organic pulses. Other ancient physicians, to the best of my knowledge, have not treated directly of organic pulses, although, from certain passages of some of their works, it may here and there be gathered, that some of them had a glimpse or presentiment of their existence, and that they were not altogether ignorant of them. Amongst these is Frederic Hoffmann, who makes mention in his before-quoted work, *De rationali pulsuum examine*, of the changes which certain diseases and injuries produce upon the pulse of that side of the body which corresponds with the organ or organs affected and injured ; notwithstanding this, however, he neither points out their distinctive characteristics, nor gives the least description of them.

* Op. cit. p. 145.

Van Swieten also recognises the uterine pulse, respecting which he has left an observation in the fourth volume of his commentaries ; it does not, however, appear from his observation, that Van Swieten knew the distinctive character of the pulse which announces the organic affections of the matrix, since he confined himself rather to the simple account of having found in a female the pulse of the menses, or menstrual purgations, which came on according to his prediction.*

All the glory of the elevation of the doctrine of organic pulses is due, as we have elsewhere said, to the justly-celebrated Dr. Fouquet. The light which his genius diffused over the distinctive characters of the different organic pulses, renders his memory dear to those physicians who are able to appreciate the value and importance of his discoveries ; and will make his name illustrious to all posterity. Amongst the other fortunate events which do honour to the past age, may be noticed with admiration, near its commencement, the publication of the work of the learned Francisco Solano, who, as we said, in

* See *Commen. in aphor. Boerhaav. Tom. iv. p. 371.*

the history of Sphygmica, developed to every physician the art of prognosticating the crises ; and towards its close, the above-mentioned publication of the treatise of Henry Fouquet upon the pulses of the principal organic affections, in which this observant professor teaches us to employ the fingers as a lynx's eye, in order to penetrate into and discover the diseases, which lie hidden and concealed in the interior of the body.*

There afterwards appeared in Naples the above quoted work *de Pulsibus*, of the celebrated Domenico Cirillo, in which the difficult subject of organic pulses is found treated with great ingenuity and consummate experience. This branch of the science has been also more recently treated upon by Messrs. Lavy and Sachero, as well as by other equally-celebrated writers, of whom we have already spoken in the general history of the sphygmical art.

This art has followed a different road in the Asiatic countries. The Chinese doctors have occupied themselves from age to age in the study of organic pulses, a study for which they

* See Fouquet, *Op. cit.* p. 64, 65, &c.

have shown a predilection, if not a great interest and taste. This happy thought has, we believe, arisen from two sources: from the maxim which the Chinese physicians still observe, of uniting to the signs deduced from the pulse the state of the organs; and from their ancient practice of confining themselves to the exclusive study of the sphygmical art; since, according to Father Duhalde, all their knowledge in matters of medicine is reduced to the exclusive knowledge of the pulse.*

This account is also confirmed by Father Hervieu, an ancient missionary in China, and also by Andrew Cleyer. The former has translated into the French language *Ouang Chou Ho's* treatise upon the pulse, which was published some centuries before the vulgar era: Hervieu asserts that China does not possess a treatise upon this subject more ancient and instructive than that of *Ouang Chou Ho*; and the latter relates in his work, *Specimen Medic. Sinic.* that the secrets of the Chinese medical art consist in the mere know-

* See the article *Pouls*, by Dr. Menuret, in the *Journal Encyclopédique*; the *Histoire du Japon*, by Kämpfer; the *History of Medicine*, by the learned Leclerc, etc.

ledge of the pulse. Besides, all travellers who have visited Asia agree in saying that the most eminent physicians of China apply the four fingers of the hand upon the artery, which they compress, at one time slightly, and at another forcibly: in this manner they continue to examine the pulse for a considerable time; and by means of its beatings, more or less frequent, or quicker, fuller or weaker, more uniform or less regular, which they observe with the most scrupulous attention, the Chinese physicians pretend to discover the cause, seat, and character of every disease, and to predict its termination. Thus, without having recourse to the information afforded by other branches of the medical science, for they do not cultivate them, and without interrogating the patient, the Chinese physicians guess, according to the above reports, in what part of the body the patient experiences pain, whether the disease is in the brain, the heart, the lungs, the liver, the spleen, the stomach, or in any other organ; and lastly, whether that or any other disease will be of long or only of short duration.*

* See Hervieu, *Op. cit.*; also *Histoire des Chinois*.

Now, by subjecting these and all the other pretensions of the Chinese doctors to the ordeal of new facts, it will easily be seen how ill-founded, if not wholly extravagant, are their pretensions, unless they have been exaggerated by the travellers and writers who have spoken of them so advantageously. In the first place, we do not deny to the Chinese physicians all the deep and extensive knowledge which they have been enabled to acquire respecting the pulse, by dint of very long and repeated observations made rather after the model of their principles, and doubtless with the assistance of their acute penetration : but there are two things essential to the nature of the question we are treating of, which we do not admit :

The first is, that even if it be true, as pretended by certain writers, that the Chinese physicians possess in a very high degree the knowledge of the pulse, it will not be less true, on the other hand, that they have attained it in a similar manner to those practical astronomers, who, although they are unfurnished with any notion of pure or mixed mathematics, and are not initiated into the principles of the astronomical science, succeed, nevertheless, by dint of a continual and long

observation of the stars, to predict practically all the changes of the atmosphere and weather, predictions which are afterwards realized.

The other thing to be observed, in the second place, has reference to the little reason, if not falsity, of their principles ; for, it appears clear from the report of the learned Father Duhalde, that the Chinese physicians presume to discover the cause, seat, and character of the various diseases, observing the pulse more or less frequent, or quicker, fuller or weaker, more uniform or less regular ; and this their pretension does not in the least coincide with the principles of the science : in the first place, because these pulses are too general and vague ; secondly, because nature, as we shall see further on, employs a different language to communicate its dispositions to the physician, as well as to discover to him the cause, seat and character of the organic affections.

The following, however, are the words of Father Duhalde, respecting the pretensions of the Chinese doctors :—" *Les Chinois,*" says he, "*sont un temps très-considérable à examiner les battemens du poulx, et à en dé-
mêler les différences, quelque imperceptibles
qu'elles soient, et selon le mouvement plus*

“ ou moins fréquent, ou plus vîte, plus plein,
 “ ou plus faible, plus uniforme, ou moins régu-
 “ lier, qu’ils observent avec la plus grande at-
 “ tention, ils découvrent la source du mal ; de
 “ sorte que, sans interroger le malade, ils lui
 “ disent en quelle partie du corps il sent de
 “ la douleur, ou à la tête, ou à l’estomac, ou au
 “ bas-ventre, et si c’est le foie ou la rate qui
 “ soient attaqués ; ils lui annoncent quand la
 “ tête sera plus libre, quand il recouvrera l’ap-
 “ pêt, quand l’incommodité cessera ” *

All these prophecies or guesses, which the Chinese doctors sell at a dear rate to the credulity of those people, sufficiently show what idea should be formed of the obscure subtilties which form the basis of their abstract theory, whatever may be the degree of their penetration, and delicacy of their tact. The Abbé Prevost, amongst other acute critics, judiciously observes, in fact, that the explanation given by the Chinese physicians of the cause, character, seat, and event of different disorders, are less the result of the experience, and more the effect of the duplicity of

* See the Art. *Pouls*, inserted in the Journal Encyclopédique of the profound Menuret.

these physicians to deceive the credulity of the public.

Nor can it be otherwise, since the Chinese physicians pretend to be able to deduce the cause, character, and seat of every organic affection, from the beating of the pulse, more or less frequent, or more quick, and from their being more full or more weak, more uniform or less regular. Besides, all these pulses are not always signs of the morbid state; they also appear in diseases of different kinds, and have not also the true characters which distinguish and determine the various organic pulses; pulses which, as we shall see, do in fact indicate in practice the presence of organic affections.

It will be sufficient, for the present, to observe, slightly, that the Chinese doctors predict the stomach-ache by the presence of the hard pulse; they announce the affections of the kidneys by means of the deep one; they predict a bad digestion, by observing the pulse which they call falling, and so on of all the other pulses, which indicate, according to the Chinese physicians, the affections of the liver, the heart, the lungs, bladder, &c. Now, all these pulses either do not exist in the

various organic affections, or, if they do exist in them, only act a secondary or accidental part. The following are Bordeu's observations upon the pulse, which announces, according to the Chinese physicians, the affections of the liver:—"Quelques historiens," says he, "rapportent que les médecins Chinois, qu'on dit être dans l'usage de juger des maladies par les divers états du pouls, assurent qu'il y a un pouls particulier pour le foie; c'est-ce qui a principalement donné l'idée d'examiner s'il y avoit réellement un pouls hépatique, sans chercher s'il étoit tel que les médecins Chinois l'ont décrit, parce que ce qu'ils ont dit à cet égard ne mérite pas attention."*

The Chinese physicians comprehend, in the class of internal pulses, the small, the deep, the slow, the obtuse rare, the simple rare, the falling, the soft, and the weak pulses; and they refer to the class of external pulses, the fluctuating pulse, the pulse which is full in the extremities of the pulsatile artery, the empty pulse in the middle of the same, the frequent acute, the full, the one which is tight like a cord, and the tense abundant pulse.

* Bordeu, Op. cit. p. 294.

Whilst the greater part of these words or expressions by which the various pulses are indicated, appear mysterious and void of sense; they are also calculated to embarrass the mind, when it endeavours to seize the abstract ideas, which clearly show the wretched state of Chinese sphygmical art, which differs but little, if at all, from that professed by Archigenes in the times of ignorance.

The Chinese physicians still continue to talk of the spirits, and of the first heat, and measure the beatings of the pulse by the standard of the respiration. The pulse which performs four beats in the course of one inspiration and expiration, is, according to the Chinese doctors, the index of the state of health and of the strength of the body; but when the pulse does not perform more than two rhythmi or beats, in that time, this is, on the contrary, a sinister omen; for they attribute the cause of it to the want of spirits, and first heat, and *vice versa*. Now who does not see the hollowness of this their pretended extraordinary knowledge in the sphygmical art?

All the prognostics which the Chinese doctors deduce from the interruption of the beatings of the pulse, or from its irregularities,

are, according to them, more or less unfavourable, in proportion as their anomalies exhibit themselves before or after the twentieth oscillation of the pulse. When they appear before, the danger is most imminent; and on the contrary, it is most remote when the irregularities are observed after the twentieth oscillation. At one time they liken the beating of the pulse to the movement of a frog, at another to that of a fish, and at another to that of a serpent, to that of the ants, or waves of the sea, &c.; errors which led even Galen astray, and which have contributed to the abuse of multiplying *ad infinitum* the number of morbid pulses, and of debasing the science into a mere empirical vehicle for their metaphysical subtilties, or obscure and mysterious reasonings; and what is still worse, is, that according to all the above-mentioned kinds of pulses, the Chinese physicians prescribe indifferently, at the same time, medicines of every kingdom, and presume and pretend to be far superior to all European physicians. *Risum teneatis amici!*

Besides, it is clear from what Barchusen and Cloïer say, relatively to the various pulses admitted by the Chinese doctors, that these latter borrowed their first ideas from the

ancient Egyptian doctors, who were the first that strangely assimilated the different pulses to the natural movements of certain animals.* Such is also the opinion of the celebrated Bordeu, as may be seen from the following quotation:—"Il se peut même," says he, "que les anciens médecins Egyptiens avoient jeté les premiers fondemens des idées communes à Galien et aux Chinois : quoi qu'il en soit, ces derniers ont parlé d'un pouls roulant, de celui qui va comme une grenouille, de celui qui ressemble au fretillement d'un poisson, d'un autre qui a du rapport au bouillonnement d'une marmite, et d'un autre qui ressemble au bec d'une poule," etc.† Such is the extent of the knowledge of the Chinese physicians in the sphygmical art.

* Vid. Barchusen, de Medic. Orig. et Progress. Dissert. de Chinens. Medicin.; Cloïer Medull. Medic.

† Bordeu, Recherch. sur le Pouls, etc. p. 257.

DIVISION OF THE ORGANIC PULSES.

THE division of the human body from a remote period, into the upper, the middle and lower region, has given rise to the division of the pulse into superior and inferior. We say, from a remote period, since Hippocrates was the first to give the reason of it, in his aphorism. Hippocrates, by following the model of nature, which he never lost sight of, remarked that the diaphragm divides the body into two parts; that diseases of the same kind show themselves under a different form; that they take a different course, and produce different effects and symptoms, in proportion as they reside above or below the diaphragm; and hence Hippocrates deduces the division of the body in two parts, and consequently the distribution of the various diseases to which they are subject.*

The manner in which Nature herself effects

* See Hippocrates' Aphorism xviii. Section iv.

the circulation of the blood in the fœtus, is another sufficient reason for believing that the division of the pulse, into superior and inferior, is natural. The first discovers the affections of the organs placed above the diaphragm; whilst the second indicates the affections of the organs lying under it. Thus, the one points out the morbose state of the brain, the cerebellum, and the meninges; of the sensory organs, of the face, of the internal and external parts of the neck, and of the upper limbs; of the pleura, mediastinum, lungs, pericardium, heart, and of the arterial and venous trunks: whilst the other, which is the inferior one, announces, indicates and accompanies the affections of the stomach, intestinal tube, peritonæum, mesenterium, the liver, the spleen, the pancreas, and, in like manner, of all the other organs of the middle and lower region of the body. So that the superior pulse is with reason called capital, nasal, guttural, or pectoral pulse, in proportion as it announces affections of the head, of the nose, throat, or of the chest; organs which, as every one knows, belong to the upper part of the body: in the same manner the pulse will be called stomachal, intestinal, hepatic, splenic, renal, hemorrhoidal, uterine, &c., according as it exhibits to the medical practitioner affec-

tions of the stomach, of the intestinal tube, the liver, the spleen, and so on of the affections of the other organs of the lower region of the body.

Amongst other writers of the last century, Bordeu has much insisted upon the division of the human body into upper and lower part; because he admits a pulse the precursor of the critical evacuations which are effected in the upper organs, and another pulse, the precursor of the critical evacuations which are performed by the lower organs, or take place in the lower parts of the body, as we shall have occasion to observe when we come to treat of critical pulses.

We adopt the same division into superior and inferior pulses, less because it has been indicated by others, than because we find it pointed out by Nature herself. "Bordeu," says Bichat, "a sans doute exagéré cette opposition entre les deux moitiés du corps; mais elle n'est pas moins réelle, et je crois très-probable que le mode circulatoire du fœtus en est la source primitive." *

The complete opposition between the upper and lower part of the body does in fact arise from the division of the sanguineous mass

* Bichat, An. gén. t. 2. p. 349.

of the foetus into two circulations, which, during the first months of its abode in the uterus, cross each other in the manner of the figure 8, as was observed for the first time, if I mistake not, by the eminent Sabatier.

In fact, the blood, instead of proceeding, during the first months of the conception of the foetus, from the capillary system of the lungs to the general capillary system, as is the case in adults, runs and circulates through the superior and inferior parts of the general sanguineous system; the functions of the lungs not then being in activity, which, as is well known, remain idle in the cavity of the thorax; and both the arterial and the venous systems are in direct and immediate communication, by means of the foramen of Botal, and the arterial canal. Now it is this direct communication of the two above-mentioned systems which explains the reason of the uniformity of the arterial and venous blood of the foetus. "J'ai disséqué," says Bichat, "plusieurs fois des petits cochons d'Inde dans le sein de leur mère: leurs vaisseaux m'ont constamment paru présenter le même fluide, qui est noirâtre comme le sang veineux de l'adulte."

* Bichat, An. gén. t. 2. p. 343.

In the above-mentioned opposition of the two circulations, the one superior, the other inferior, which are performed in the foetus, is found delineated by Nature herself, the division of the pulse into superior and inferior. And is it not by means of the *linea alba*, that Nature separates the affections of the organs of the right from those of the left side of the abdomen? The diaphragm is, therefore, the limit of not a few diseases, which, it is well known, are confined at one time to the cavity of the chest, and at another to that of the abdomen, without the diseases of the one disturbing the organs of the other cavity, and *vice versa*; so much, then, is the presence of the diaphragm instrumental in maintaining in a certain degree of independence the organs of either region of the body, by means of the division which the diaphragm there establishes; an observation expressed by Hippocrates himself in the before-mentioned aphorism.

In general, the superior pulse is vibrating, quick, and vehement; while, on the contrary, the inferior one is small, deep, and often slow and rare. The one, from its accompanying the diseases of the superior organs which are nearest the heart, focus, and centre of internal life, must of course participate in the strength, and energy

with which the heart performs its contractions or vibrations, which it communicates to all the parts of the body, by means of the arteries, especially to the organs nearest to it, in which the effects of its vibrations necessarily take place with greater force and energy. But the case is wholly different with the inferior pulses which announce the affections of the organs of the middle, and, above all, those of the lower region of the body : the organs of this region being more or less distant from the heart, must necessarily experience, in a manner more or less feeble, the effects of the vibrations of the heart ; effects which take place with less force and energy.

In other words, the condition of diseases of the stomach, intestinal tube, liver, spleen, and so on, of all the other inferior organs, varies. These are, as I have said, more or less distant from the centre of the circulation of the blood ; the arteries which are there distributed are very inactive, if not totally so ; the vibrations of the contractions of the heart arrive there without energy and strength, and all concurs in making the course of the blood to be performed slowly in the organs of the middle, and especially of the lower region of the body. Add to which the other ar-

rangement of nature, that the sensibility of the inferior organs cannot elevate itself to such a degree in the state of disease, as the vitality of the superior organs can, their general structure being fragile, spongy, and weak; and from this concurrence of physical circumstances, the inferior pulse (the one we are now considering) derives its smallness and depth, as well as its slowness and rarity, which do not fail sometimes to accompany and follow it.

It may here be said, perhaps, that the structure of the cerebrum, cerebellum, and lungs, is also pulpy, and consequently fragile and weak, although all these three belong to the order of superior organs. Their fragility is true in appearance, but not in fact; first, because the lungs differ not, as has already been observed, from an assemblage of vessels, which determine, with the nerves, the degree of inflammability of the various organs with their degree of exaltation; besides which, the lungs are so near the heart, that it would appear at first sight that Nature's intention had been to make one organ of both, so near is one placed to the other; which certainly enables the lungs to feel all the impetus of the vibrations, which the heart successively com-

municates to them. As to the difficulty which occurs respecting the fragility of structure of the cerebrum, we answer, that it is not only assisted by the elevation of its sensibility, which renders it capable of the greatest degree of exaltation in a state of disease; but also by the great force with which the heart impels forward the red blood, which is conveyed to it by the carotid and vertebral arteries, and makes it feel by this means the beneficial effects of its energetic vibrations. So true is it that the brain and lungs perform an active part in the animal economy, notwithstanding their frail structure, and that both organs, the brain and the lungs, are the first to perish, when the heart no longer performs, as usual, its systoles or contractions.

Hence, inasmuch as the sensibility of the brain and lungs can elevate itself much more than that of the inferior organs in a morbose state, inasmuch as the arteries are numerous in the one, and not so in the other; for both these reasons, the superior pulse, which indicates the presence of affections of the superior organs, must necessarily be vibrating, quick, and vehement; and also because the state of plethora, which predominates there, contributes to it; for the lungs and brain

receive a greater quantity of blood, in equal times, and, in consequence, the exercise of their functions becomes more active and elevated. An evident proof of this is to be found in the observation of the hard, elevated, rapid, vehement, and vibratory pulse, which takes place in phrenitis and pulmonia.

Every organic pulse may arise from two causes ; from the alteration and waste of the tissue of the viscera, or from the disturbance, disorder, or want of harmony in their functions, arising from the excessive excitement, or from the atony of some diseased organs. In the first case, the irregularity of the pulse takes place, and in the second, most frequently its alteration. If a local affection does not consist in a state of injury or alteration of the structure of an organ, it must necessarily consist in the disturbance or disorder of its functions, or of its partial life and excitement. The alteration of the pulse is in proportion to its irregularity, and both constantly correspond to the sphere of activity of the affected or diseased organ : the more sensible this is, the more pronounced, in proportion, will be the irregularity or the alteration of the pulse, and *vice versa*.

We cannot, therefore, admit Fouquet's principle, that the organic pulses in general are

but little different from the natural pulse, and that of calling them pulses of the indispositions, or slight affections of the organs; as if the local diseases of the brain, the lungs, the heart, &c. were not more frequently indicated by the distinctly-pronounced irregularities, or by the great alterations of the pulse. His mode of thinking upon organic pulses is more often found to be confirmed in the slight and superficial obstructions of the liver, the spleen, and other viscera slightly excitable; but to all appearance, is not so in the superior organs, whose sensibility is exalted and elevated in such a manner, in certain diseases, as not to allow of a mistake, when we wish to deduce their force or degree of intensity from the state of the pulse; neither, as the same author asserts, are the affections of the organs unaccompanied by fever and irritation, as both of them may be observed, in consequence of the exaltation of the sensibility of the affected or diseased organs, and again by the stimulus of the pain, more or less acute, frequently resulting from them.

The following is what Fouquet observes, when treating of organic pulses:—"Mais veut-on avoir," he says, "une idée plus distincte du pouls de la santé? Il n'y a qu'à se pein-

“ dre le pouls organique proprement dit, dont
 “ il ne diffère que par de très-légères nuances,
 “ le pouls de la santé n’étant lui-même qu’un
 “ vrai pouls organique. Le pouls organique
 “ proprement dit,” he also adds, “ c’est-à-dire
 “ le pouls des incommodités ou légères affec-
 “ tions des organes, est celui qui, comme le
 “ pouls de la santé, présente constamment les
 “ caractères essentiels avec les seules modifica-
 “ tions naturelles ou subsidiaires, et qui, comme
 “ lui, est sans fièvre et sans irritation du moins
 “ marquée.”*

Moreover, to be convinced of the sensible difference which exists between the organic pulses and the natural ones, we have only to follow practical observation; then we shall perceive, from the change of the natural into an organic pulse, during the presence of a local affection, and from the change of the organic into a natural one, as soon as the local affection is dislodged from the organ, how much the one differs from the other.

We however allow, that, in order clearly to distinguish the organic pulses, which result from the local affections of the viscera of

* Fouquet, *Op. cit.* p. 74, 75.

obtuse sensibility, from the natural pulse of certain individuals, not in perfect health, a complete knowledge of the art is requisite; their difference, however, does not therefore the less exist; and it was, I believe, the circumstance of the slight and obscure character of the organic pulses, in affections of viscera of ignoble structure and obtuse sensibility, which induced Fouquet to believe that the organic pulses differed little or nothing from the natural one. In other respects, we find, in the description of the distinctive characters of the various organic pulses which follow, a series of matter-of-fact reasonings, to convince us that the organic pulses which discover the presence of local affections of the viscera of noble structure and of acute sensibility, have nothing to do with the natural pulse.

ART. I.

OF THE CAPITAL ORGANIC PULSE.

FOLLOWING the anatomical order, we proceed from the superior to the inferior organic pulses. It must be first observed that it is in the affections of the cerebral organ that we find the capital pulse, as that which announces and accompanies them at the same time: this is, therefore, the first of the superior pulses, which all differ among themselves, although they all belong to the same order of superior pulses. They have all, it is true, qualities in common; but each is notwithstanding endowed with a character proper and peculiar to itself, as we shall shortly see in their description.

Beginning with the capital pulse, the first remark to be made is, that its distinctive character consists in a sensible and pronounced elevation of the anterior part of the pulsatile artery, which strikes strongly against the point of the index and middle fingers, to which exactly corresponds the above-mentioned eleva-

tion of the artery, which constitutes its distinctive character; and whilst the anterior part of the artery raises, elevates and manifests itself with energy and force, its posterior part, which corresponds to the third finger and the little one, either preserves, for the most part, the level of the horizontal plane, or elevates itself above it. In the first case, the anterior part, which elevates itself above the level of the plane of the horizon, makes an acute angle with the posterior part of the artery, which preserves the horizontal line; and in the second, the space occupied by the annular finger scarcely ever exceeds the natural elevation of the posterior part of the artery. Sometimes the whole distinctive character of the capital pulse is reduced to an elevation which extends throughout the whole arterial canal, corresponding with the plane presented to it by the four fingers; but this elevation is not so sensible, nor of the same description, as that which occurs in the case above mentioned. As we do not, therefore, find in the pulse, the difference existing between the elevation of the anterior part and the almost natural state of the posterior part of the pulsatile artery; the distinctive character of the capital pulse consists wholly, as I

have said, in the above-mentioned elevation and exaltation, which extends itself throughout the whole length of the arterial tract pressed by the fingers.

And even should none of the above cases prove that the pulsatile artery does not elevate itself either in part or wholly, on account of the slightness of the disorder; the pulse does not the less exhibit itself hard, tense and irritated, and continues to vibrate its rhythm with such vehemence and force under the index and middle fingers, as to make the artery appear to wish to throw off, so to speak, the pressure of both fingers, which is sufficient to prevent any mistake respecting the presence of certain organic affections of the brain. Thus the impression produced upon the exploratory organ by the capital pulse, differs not greatly from that of the oscillations of a violin-string, so rigid, quick, and vibrating are its motions.

The capital pulse, however, varies in proportion to the seat of the local affections of the head, from which it receives the epithet capital. In the first place, the capital pulse shows itself more tense, irritated, and vibrating in internal than in external affections of the head. This difference is remarkable, when a compa-

rison is made between the pulse which predominates in deep wounds on the head, and that which takes place in the venereal tumours which occupy the external parts of the cranium, as is generally seen in exostosis, gumma, or any other external tumour; the sensibility of the parts adjacent to the interior of the cranium, is more altered and exalted than that of its external parts, and hence arises the greater tenseness, irritation and vehemence, of the pulse which indicates and accompanies the internal affections of the head: on the contrary, in erysipelas on the face and neck, in affections of the gums, teeth, and all other external parts of the head, we find the capital pulse less irritated, tense, and vibrating. So sensible to the touch are the variations of the capital pulse, in proportion as the seat of the affections of the head varies, that it is not rarely we find such a pulse from capital become nasal, guttural, or pectoral, according as the seat of the affection extends itself along the nose, the throat, or the breast: another peculiarity to be remarked in practice, is that the right-hand pulse is still more irritated, tense, and vibrating, than the left-hand one, or the latter more so than the former, according

as the seat of the affections, as well internal as external, is confined to the right or left side of the head, and *vice versa*.

The proof of this fact results from practical observation; for, in proportion as the hemicranial pain is confined to the right or left side of the head, the right-hand capital pulse is found to be more tense, irritated, and vehement than the left, or the latter more than the former, when the same affection is confined to the opposite side. The correspondence of the state of the pulse with the affected side of the head is so marked, that, from the suppression, either natural or artificial, of the hemorrhage of the right nostril, we frequently find the hemiplegia of the right side of the body, or that of the left, when, on the contrary, the hemorrhage of the left nostril has been suspended. This is also, in its turn, another proof that the nerves, the arteries, and the veins belonging to the affected side of the body, feel more directly and more deeply the morbose impression, which explains the reason of the greater alteration of the pulse corresponding to the side of the affected part of the head, the face, or any other region of the body. “Le pouls du côté de l'oreille

“ par laquelle se faisoit l'hémorrhagie,” says Bordeu, “ étoit beaucoup plus fort et plus “ redoublé que l'autre.”*

According to Pinel, the capital pulse is more or less irritated and vibrating, like a tense string in idiopathic, true or hypersthenic phrenitis ; in sanguineous, or robust apoplexy, in madness, in raving delirium, in hypersthenic cephalalgia, and in all the other affections which derive their origin from the exaltation of the sensibility of the brain, or from the inflammation of the meninges which belong to it. The state of excitement and violence in which the cerebral organ is found under such circumstances, increases the impetus of the course of its circulation ; exalts the sphere of its activity, and alters the functions of it ; and the whole of this series of morbose phenomena concurs to impress upon the system of the general circulation, and consequently upon the heart, the arteries and the pulse, the image or form of the affection of the cerebral organ ; for the capital pulse never fails to indicate in similar cases, by the sensible elevation of the anterior part of the pulsatile ar-

* Op. Cit., p. 280.

tery, the seat of this or that affection of the above organ; an elevation which is followed by the secondary characters of the capital pulse—we mean the tension, irritation and vehemence, or vibration of its beats; and by similar variations and modifications of the pulse, nature indicates the state of irritation, inflammation, alteration, spasm, or oppression of the cerebrum. And when the fever increases, the acceleration of the beats of the pulse is observed, an acceleration which is accidental, and favours, notwithstanding, the termination, whatever it be, of the disease, or of the affection whose seat is in the brain.

But as soon as the symptoms which accompany the hypersthenic diseases or affections of the brain, have arrived at the highest degree of violence, from that moment most frequently the signs of effusion or extravasation of a portion of blood into its ventricles, or through the dura and pia-mater, into the basis of the cranium, or any other internal part of it, begin to appear; the vital powers generally become weakened, and the capital pulse, whilst in this case it loses its vehemence, and elevates the anterior part of the artery which represents it, in a very slight degree, becomes peculiarly unequal, as is confirmed by practical observation

in hydrocephalus. Another sensible change of the capital pulse is found in the second period of the yellow fever, accompanied by the cephalalgia, for, from being hard, full and tense, as the capital pulse is generally found to be in the first period of the above-named disease ; it becomes in the second, small, quick, and weak, although the cephalalgia continues.

The capital pulse becomes also weak and irregular in serous or hyposthenic apoplexy ; slow and concentrated in melancholy, or imbecility ; soft, weak and irregular in hyposthenic cephalalgia ; quick and irregular in the first period of hydrocephalus ; slow and irregular in the second ; and frequent, weak and irregular in the third period. The capital pulse is soft and weak, and sometimes natural, in brain-fever ; which resembles, if not identical with ataxic and sporadic fevers, is, and derives its origin from the disturbance or disorder of the functions of the cerebral organ : we also very frequently find in this disease a gradual effusion of a portion of serous or sanguineous fluid into the lateral ventricles of the brain, and the brain-fever has for this reason much analogy with the apoplexy of old persons, to the developement of which concur most frequently the disturbance of the cerebral func-

tions, and the waste of a portion of the serous or sanguineous fluid.

The capital pulse is hard, tense and slow in tetanus and epilepsy, and small and scarcely perceptible in catalepsy, when all these maladies proceed from a disorder, or circumscribed disturbance of the sensory organ. Besides these variations to which the capital pulse is subject, and which necessarily result from the different character of the various affections of the brain, others may also be observed; and these, inasmuch as they proceed from the difference of sex, age, and physical constitution, as well as from various modes of living,—these, I say, as they proceed from secondary causes, are themselves also accidental or secondary. Thus, it is not rare to find, in practice, the capital pulse, slow, rare, vehement and hard in certain individuals affected by lymphatic or hyposthenic apoplexy; whilst it is weak and unequal, or slow and unequal, or rare, deep and internal, in some patients attacked by the same disease. The same may be said of many other changes of the capital pulse, which arise in consequence of some affections of the mind, or of some other causes, equally accidental or secondary.

That the knowledge of the distinctive cha-

racter of the capital pulse is of the first importance in the exercise of practical medicine, cannot be doubted ; because it is not so easy as some imagine, to recognise by sure signs the inflammation of the cerebral membranes. Selle, Pinel, and other equally-eminent physicians, thought in the same manner respecting the uncertainty of the diagnostic signs of phrenitis. In fact, the diagnostic signs of phrenitis frequently exhibit themselves, whilst the disorder which those signs discover is more frequently a symptom of another disorder. To avoid, therefore, the serious evil of confounding one disease with the other, which might easily be done, we should assure ourselves of the presence of the phrenitis, by the distinctive character of the capital pulse ; observing, above all, the circumstance that such a pulse ought to continue, as long as the suspicion of phrenitis, or of any other similar affection of the brain, exists. When the pulsatile artery does not show, at the top of the index and middle fingers, the above-mentioned elevation, which constitutes, as I have said, the organic or distinctive character of the capital pulse, strong doubts should be entertained of the phrenitis, or of any other affection which it may be thought originated

from the alteration of the noble tissue of the fibres of the brain, or from the disturbance of its functions; whilst it may also arise from the sympathetic or external effect of the affections of another organ:—
“*Que de faits,*” says the learned Pinel; “*que de faits ne reste-t-il point encore à rassembler pour établir une sorte de correspondance entre l’histoire des symptômes, et les lésions particulières de l’organe encéphalique ?*”*

In corroboration of such a correspondence may be adduced the perfect knowledge of all the variations of the capital pulse, which correspond to the various affections of the brain. Whether the elevation of the digital or anterior part of the artery which constitutes the organic and distinctive character of the capital pulse, is perfectly pronounced, as is the case in phrenitis, and other hypersthenic diseases of the brain; or whether, on the contrary, it becomes smaller, contracts and lowers itself, or becomes more or less concentrated, as is seen in chronic or hyposthenic diseases of that organ; in all these cases the presence of the capital pulse never fails to indicate the

* Vid. Pinel, Nosograph. Philosoph. t. 2, p. 208.

existence and seat of both its affections; and it is that which enlightens the medical practitioner as to the true diagnosis, if it does not wholly save him from uncertainty, and from the error of confounding the various injuries or diseases of the brain with some other symptoms, or general and local affections of any other organ, viscus, or system.

The correspondence of the gradations of the organic and distinctive character of the capital pulse with the various affections of the brain, is such that it is not difficult for a person who has accustomed himself to them to determine, by means of the elevation more or less sensible, or more or less diminished, of the anterior part of the pulsatile artery, what is the character of the affection; that is, whether it be acute, chronic, or organic. The same also may be observed of every other organic pulse, whose character more or less pronounced, or more or less weakened, shows the nature or character of the different affections or diseases of the various organs so affected or diseased, as we shall see in the course of this work. *Cæteris paribus*, the character of the various organic pulses is perfectly developed, elevated, and sensible in hypersthenic affections of the various organs;

whilst it appears more or less confined, small, circumscribed, or concentrated in chronic and hyposthenic affections. It does not, however, follow; because the character of the various organic pulses in these last-mentioned cases, is so weakened, confined, and little pronounced, that it is not sufficiently sensible to correspond to the object of the diagnosis, the prognosis, and treatment of various disorders. It is only in syncope and in swoons that the character of the various organic pulses ceases to be sensible to the touch.

ART. II.

OF THE NASAL ORGANIC PULSE.

A KIND of gradation of character, capable of misleading the mind, very frequently takes place in the superior organic pulses. Three causes chiefly contribute to this effect:—1. The reciprocal proximity or neighbourhood of the different organs belonging to the head, trachea, and breast, to which must be referred the superior pulses; 2. The circumstance that the superior organs are under the dependance of the nerves proceeding from the same ganglia; and lastly, the tendency or inclination, which their affections have to extend themselves from one to another of the parts of the body mentioned. These are the causes which place in a sphere of relationship, gradation and analogy, all the superior pulses; and of this we have one amongst other examples in certain catarrhs, in which the frontal sinus, the brain, nostrils, throat and the lungs, appear to be obstructed. It is then that the superior organic

pulses combine together, or succeed each other, or one predominates over the others, as is precisely the case when the organ relating to it is deeply affected by the disorder. In these cases, it is only the skill and practice which is gradually acquired that can avoid the error of confounding one with the other, to such a degree does the gradation of the characters of the organic superior pulses, in certain diseases, deceive at first sight. And what has here been said of the superior organs, is found to be the case also in the pulses relating to the viscera belonging to the abdomen, or lower cavity of the trunk, as the viscera of this or any other cavity are also in a sphere of reciprocal affinity, proceeding from the above-mentioned causes.

In order to proceed, therefore, with a knowledge of the cause, to the examination of the nasal, guttural, and pectoral pulses, after having treated of the capital one;—it is necessary to have the mind possessed with a clear idea of the greater or less distance of the organs from the centre of the circulation of the blood, as well as of their specific construction and their various modes of feeling. It is by the light of these considerations that we are enabled to determine the difference which distinguishes the

various superior organic pulses :—thus, the nasal pulse, which announces the presence of the various affections of the organ of smell, must necessarily, as a superior pulse, participate, from the first, in the strength, hardness, and tension of the capital pulse, with this difference, that while the nasal pulse is not either so strong or vehement as the capital one, it is also more frequently characterized by a rather obscure redoubling of some of its diastoles, or shows itself concentrated and almost convulsive,—so deep and irritated, in certain cases, is the nasal organic pulse.

Proceeding from the above-mentioned properties of the nasal pulse, which we consider as secondary or accidental, to its character, when we reflect that these may not exist, whilst the nasal pulse does; proceeding from these accidental properties, we find, in the following configuration of the pulsatile artery, the image of its mechanical, organic, or essential character. In fact, the existence of the nasal organic pulse is certain in the presence of local affections of the nostrils or of the nose. The pulsatile artery generally loses its cylindrical form; for whilst its posterior and middle or central part, which correspond to the point

of the little, annular and middle fingers, rises in the form of a small hillock; its anterior or digital part, on the contrary, appears to flatten itself, like a small nervous riband, under the tip of the index finger: thus, it is in this track of the flattened artery that we perceive in motion certain round bodies, similar to so many drops of water, which come driven with force against the apophysis of the radius, and from which the shock appears to be transmitted to other drops which follow the first. At other times a kind of formication is felt, or otherwise the impression of a movement of only two round and large bodies, which run rapidly against the index finger.

The nasal organic pulse is distinguished from the critical one, because the former arises from the affections of the pituitary membrane, and therefore of the organ of smell; and the latter has relation with the salutary efforts and movements made by nature, for the purpose of directing, in certain acute diseases, towards the blood-vessels which are in the nostrils, the matter of the crisis, which is there operated, according to medical practitioners, under the form of hemorrhage, hence called nasal; or otherwise under the form of excretions of some mucous or pu-

ruled matter, as will be seen when we come to treat of critical pulses. In fact, the nasal critical pulse is either foreign to the affections of the organ of smell, or it takes place in order to remove the disorder, and not merely to indicate its existence, as is precisely the case of the nasal organic pulse. The former unites to the greater elevation of its mechanical character, the subsidiary quality of its rebounding or redoubling pulsation, being, in certain diastoles, soft, full and vehement; whilst the latter announces itself with the before-mentioned small hillock of the posterior and central part of the pulsatile artery, which is found in this less elevated; and is at one time hard, irritated, convulsive, and not at all rebounding; at another, strong, tense, and frequent; and then the round bodies which run in the tract of the flattened artery, are smaller, and have more motion in the nasal organic pulse, and bigger, with less motion in the critical one.

The nasal organic pulse, such as it has been described, is observed in cold in the head, or phlogosis of the mucous membrane, in hemorrhage, either active or passive, in certain catarrhs, with the ejection of lymph-

tic or mucous matter from the nostrils, in the fractures and caries of the nasal bones, and of the ethmoides, as well as in the developement of the polypus of the nostrils, or of any other organic affection of the external or internal parts of the nose. The obscure redoubling of some diastoles takes place in the organic nasal pulse, whenever in the affections of the organ of smell, there takes place a discharge either sanguineous, serous, lymphatic, or purulent; not because the nasal pulse then acquires the character of a critical one, but rather because the irritation occasioned by organic affections in the internal region of the nose, attracts there humours, which then approach, and their accumulation generates the redoubling of the organic nasal pulse. In support of this view of the subject, Bordeu's opinion may be adduced, when he says, "Un malade qui avoit les
"os propres du nez cariés, ainsi que l'eth-
"moïdes, et une portion des os du palais,
"évacuoit de temps en temps beaucoup de
"pus et de matières ichoreuses par le nez;
"il avoit souvent le pouls rebondissant."*

* Bordeu, Op. cit., t. i. p. 282.

Thus, the redoubling of the diastoles is accidental, and in no way essential to the natural character of the organic nasal pulse; whilst the said redoubling scarcely ever fails in the critical nasal one.

ART. III.

OF THE GUTTURAL ORGANIC PULSE.

THE guttural organic pulse presents itself to the touch with an eminence similar to an arch, produced by the part, rather posterior, of the pulsatile artery; and whilst in the above-mentioned space of the artery, the impression of the eminence thus formed is felt, on the contrary there is found in its cylindrical form the anterior part of the artery itself, which effects its beats that appear to be free or isolated from those of its other part, and which become tense and hard upon the index finger. The guttural pulse has therefore a certain affinity with the capital pulse, and also with the pectoral one; but the former is not less distinguished from the latter on that account. In the first place, the guttural pulse differs from the capital one, on account of the elevation which takes place in every diastole, confining itself, as we have said, to the part rather posterior of the

pulsatile artery; whilst that of the capital pulse exists in its anterior part: in one also the elevation or prominence shows itself in form like an arch, or wavy, whilst that of the other does not certainly appear so fashioned: besides, the guttural pulse is inclined to be fluctuating and redoubled, while the capital pulse has no such disposition.

Finally, the guttural pulse differs from the pectoral one, the organic character of the first not being so elevated as that of the other; the more so, as the eminence which indicates the organic or mechanical character of the pectoral pulse, confines itself, as we shall see, within the central space, and not within the rather posterior part of the pulsatile artery, as is observed in the guttural pulse, whose beatings are not so strong and equal as those of the pectoral one.

From what has been said, it will be clear that the guttural pulse occupies a middle station between the capital and the pectoral pulses; nor can it be otherwise, since the throat, to which the guttural pulse belongs, itself occupies a middle station between the head and the breast. From this, the reason will easily be understood why the eminence which characterizes the pectoral pulse, which

has relation to the diseases of the breast, which is nearer the heart than the head and throat, is more elevated than that of the guttural, and still more than that of the capital pulse; for the energy of the vibrations, communicated by the heart to the arteries by means of its contractions, is in a direct ratio of the distance of the various organs: the nearer any organ is to the heart, the stronger is the effect of its vibrations, and *vice versa*.

The guttural pulse displays its elevation, as we have said, like a wave or an arch, in the organic affections of the larynx, pharynx, and consequently of the trachea and œsophagus, which are a continuation of them. The same takes place in the alterations of the tissue, and in obstructions, of whatever nature, of all the glands in the region of the throat.

In quality of superior pulse, the guttural participates in the rigidity, hardness, and tension of the capital pulse; and with these characteristics, which are owing rather to the kind of superior pulses, it discovers the affections or local diseases which disturb the order of the functions of different parts of the throat. The guttural pulse has, in fact, this hardness, rigidity, and tenseness, in the beginning of

the various kinds of angina or quincy. Then, in the sequel, it acquires, in the developement of such disorders, some degrees of greatness and vehemence, and of frequency or celerity, when the angina is of hypersthenic character.

But when the affections of the throat have an hyposthenic nature, the guttural pulse preserves itself more or less hard and tense, or becomes rather concentrated, as is observed to be the case in guttural cancerous angina, in which it may also be distinguished by means of its excessive frequency and smallness: its beatings are still more frequent and weak in the cynanche trachealis humida, and not less small, frequent and weak in the atonic, slow, or œdematous angina. The guttural pulse is likewise found thus deteriorated in the laryngeal phthisis, which may be considered as the effect of that chronic or hyposthenic state which succeeds to inflammatory angina. The guttural pulse is hard, irritated and tense, in the swellings of the amygdaloid and maxillary glands: sometimes, in the critical revolutions of these and of other diseases of the throat, the guttural pulse changes its character; because its beatings cease then to be hard and tense, and become more or less full,

equal and soft, as we shall have occasion to observe in the treatise upon critical pulses.

Finally, the variations of the guttural pulse may be attributed to three causes;—to the different character of the various affections of the throat; to their various degrees of intensity, and to the state of the vital powers. If the guttural pulse shows itself with the greatest degree of elevation of the rather posterior part of the pulsatile artery, and with an intense degree of hardness, tension and strength of its rhythm; in this case, the affections are of a phlogistic character, as is most generally observed in strong and youthful subjects; and, on the contrary, if its prominence is little elevated, or its mechanical character is little pronounced, then the affections of the throat have a different character, especially when its beatings are weak, and not at all hard and tense, as is found in cachectic persons, and those of a weak constitution: or whilst the guttural pulse announces itself by an obscure wavy elevation, and its beatings are also small, unequal, frequent, and by no means hard; in this last case the guttural pulse indicates, in the manner described, the passage of the inflammation of the throat into gangrene.

ART. IV.

OF THE PECTORAL ORGANIC PULSE.

THE pectoral organic pulse derives its name from *indicating* the presence of affections of the breast. It discovers itself to the exploratory organ by an eminence, resembling a small hillock or arch, which surpasses in elevation that of every other organic pulse, so external and pronounced is the mechanical character of the pectoral pulse. The other peculiarity to be noticed, as characterizing the pectoral pulse, is, that its presence is observed in the middle or central part of the pulsatile artery, whilst its extremities preserve the cylindrical form, and the diastoles or dilatations performed by its extremities, do not exceed the limits of their diameter.

The pectoral pulse is also eminently superior, although such ought not to be the case if the situation of the thorax be considered, which is certainly inferior to the head and the throat; but the thoracic cavity has this ad-

vantage, of including the heart amongst its other organs: and this explains the reason why the vibrations which the heart, by means of its contractions, communicates to the arterial tree, and consequently to every organ and system, must be stronger and more energetic in the lungs, than in any other internal part of the body. It is therefore to the efficacy of these impulses of the contractions of the heart, which stimulate more forcibly the organs of the breast, that the pectoral pulse owes the superiority which it boasts over all the other pulses of its order. The circumstance of the location of the lungs, therefore, being near the first agent of the circulation, causes the organic affections of such an organ to be indicated with the greatest elevation of which the pulsatile artery is capable, and which determines the mechanical character of the pectoral pulse.

The pectoral pulse varies as the affections of the organs of the thoracic cavity vary. At one time it announces, as we shall see, the organic affections, consisting in the alteration of their tissue; at another it discovers their inflammatory state, and at another that of atony and weakness. In general, its beatings are more pronounced, fuller, more dis-

tinct, more equal, and stronger, than those of any other superior pulse, such as the capital, the nasal, or the guttural; but while its beatings manifest themselves more distinctly and more strongly, they never fail, on the contrary, to exhibit themselves less frequent and less quick than those of the other superior pulses.

In the first place, it must be observed that when the pectoral pulse is small, thin, tense, unequal and intermittent, as is frequently observed in practice; it then announces the presence of local affections of the organs contained in the cavity of the thorax. Such is the appearance of the pectoral pulse in ossifications of the ventricles and auricles of the heart, and of the arterial valves and trunks. This diagnosis is confirmed by the accession of dyspnœa or difficulty of breathing, by the dry or convulsive cough, the threatening symptoms of suffocation, or that of seeing the patient gradually fall into a profound swoon. But these alarming symptoms or effects of the above-mentioned affections of the heart or arterial trunks do not always correspond with the degree of their intensity; the variations of the pectoral pulse more often discover their existence, and more or less determine their

degree of severity; since, whilst the ossification, for example, exists in the ventricles of the heart, in the auricles or arterial trunks of old men, those symptoms do not appear, and are not, in fact, so alarming in old persons, as in adults and young ones. Not the less useful, however, on this account, in supplying this defect, is the pectoral organic pulse, which discovers the existence of it, and determines its character; although the difficulty of breathing, the cough, and the symptom of suffocation, are not, in old persons, intense and alarming in proportion to the character and seat of those affections of the heart, or arterial trunks.

The reason why the ossification of the ventricles, auricles, valves or arterial trunks, of old persons, is not followed by intense and alarming symptoms, may be found in the following observations:—First, it must be remarked, that the ossification of one or other of the above parts, is almost natural to the being of old age. We say natural, because this organic affection usually proceeds by slow degrees with age; old persons accustom themselves to it in the mean time, and consequently, the various symptoms constituting its external appearance, cannot but be less intense and less

alarming. The difficulty of breathing, therefore, the dry cough, the danger of suffocation, the swoonings, and all other external signs, do not correspond exactly either to the character or to the degree of intensity of the before-mentioned organic affections of old people ; neither from them can we venture to predict the fatal termination, when the pectoral organic pulse is not consulted under all its possible forms.

Besides, it is known, that as the ossification in question does not proceed in old persons, as it generally does in adults, from inflammation, and consequently from the obstruction of the common membrane of the arteries,—it has not therefore the power to produce in the former such strong and alarming symptoms as it does in the latter. Such, at least, is the result of practical observation.

Following, in this manner, the guidance of the thin, deep, rigid, irregular and intermittent pulse ; we can announce, in the second place, the dilatation of one of the ventricles or auricles of the heart ; provided, that with this variation of the pectoral pulse is combined anxiety, palpitation of the heart, and the other symptom felt by the patient of unexpectedly waking with sudden terror. Always recollecting, that both in this, and the other already-

described organic affection of the heart, the pectoral pulse never fails to correspond with the state of the vital powers of the patient ; so that both the irregularity and the intermittency are accompanied by the strength or weakness, greatness or smallness, of the beatings of the pectoral pulse, according as the patient is more or less old, strong or weak.

The other organic affection to which the heart is generally subject, is the induration of its fleshy substance, which discovers itself to the touch of the observer, together with the irregularity, depth, thinness, and intermittence of the pectoral pulse ; for, whether the first, the second, or the third case of organic affection of the heart exists, there is found in all three the same disorder or disturbance of the circulation of the blood, which arises from the difficult and forced contractions of the heart, which, not being able to expel the blood with order and regularity from its cavities, in the presence of the above-indicated organic affections, there result from it the depth, thinness, irregularity and intermittency of the rhythm of the pectoral pulse. But we shall be told that the guidance of such a pulse does not conduce either to point out the seat, or to determine the kind of affection of the heart.

If the presence of the ossification,—it will be said,—the hardness, the dilatation, and all the other organic affections of the heart, are nearly all announced with the smallness, thinness, depth, rigidity, irregularity and intermittency of the pulse,—of what use is then the guidance of the pectoral organic pulse? And it is not possible, we shall be told, in the third place, that in order to distinguish one affection of the heart from the other, it is sufficient to find the pectoral pulse proportionately small, deep, irregular and intermittent; since this very gradation or modification of the pectoral pulse, may and ought to be referred as well to the organic affections of the heart as to the different degree of intensity of each of their species: in such a case, how is it possible ever to distinguish one organic affection from another? The frequency of the syncopes which take place in them, the intensity of the suffocation which threatens with greater violence the patient's life, and the more prolonged intermittency of the *rhythmi* of the pectoral pulse—all these symptoms, although violent and alarming, cannot, however, indicate with certainty the presence of the induration of the fleshy substance, or of the dilata-

tion of one of the ventricles of the heart, of its auricles, or arterial trunks.

And by how much is not the greatness of the difficulty increased, which relates to the circumstance of determining whether the aneurism of one of the ventricles of the heart is, or not, complicated by the effusion of any fluid into the cavity of the breast, of the pericardium, or into both at the same time? Because it is clear from observation, that the pectoral pulse shows itself almost equally thin, small, rigid, deep, irregular, and intermittent, and the other symptoms are not more intense in one than in the other case, or in this more than in that affection.

Similar to this is the other difficulty which occurs, in determining whether the ossification of the arch of the aorta is or is not *complicated* with the dilatation of one of the ventricles of the heart, of one of its auricles, or with the induration of its fleshy substance; since the symptoms with which such diseases show themselves, and the peculiarities of the pectoral pulse, are as alarming in every simple organic affection of the heart, when it has made any progress, as they are in their various complications. The fact is, that a simple

organic affection of the heart can and must overturn the order of the circulation of the blood, by rendering the contractions of its ventricles and auricles painful, difficult, and irregular.

The same difficulty is also met with in practice, when we desire to ascertain whether the disease which threatens the patient's life be the carditis, or the pericarditis, although the pain is greater in the one than in the other inflammation. In the first place, it must be remarked that patients are very frequently unable to define exactly the degree of intensity of pain occasioned by the disease, or are ignorant if it be an inflammation of the heart which then re-acts upon the sympathetic affections of the pericardium; or if it happens on the contrary, that the pericarditis re-acts upon the sympathetic affections of the heart; and in this two-fold case, the patient is prevented by the difficulty, from pointing out the true seat of the disorder. Add to which another difficulty; viz., that the exercise of respiration becomes painful and difficult, as well in carditis as in pericarditis; the anxiety likewise becomes extreme, the dry cough is troublesome, and the existence of the person labouring under it endangered, so simi-

lar are the symptoms or signs in both these phlegmasies. It is only by general and local bleedings upon the appearance of the first signs of either phlegmasy that the fatal event can be prevented. Such is, at least, the excellent advice left us by the worthy Corvisart, in his admirable work—*Essai sur les maladies et les lésions organiques du cœur et des gros vaisseaux*. It does not appear therefore, from what has hitherto been advanced, that we can decide from the external symptoms, whether the patient's sufferings arise from carditis, or pericarditis.

And what is worse, we shall be told, is, that neither is the pectoral pulse adequate to fulfil this desideratum of medical knowledge; because the carditis and pericarditis, which both equally disturb the motions of the heart, cannot but equally alter the pulse, and this which shows itself in both, under the same alteration, is not capable of indicating, whether it be one or the other disease in action, or present. In fact, in both these phlegmasies, the pectoral pulse shows itself with the before-mentioned prominence in the central space of the pulsatile artery, accompanied by the same secondary characters; its beatings may be said to be more or less hard, tense, strong, irri-

tated, frequent, embarrassed, and unequal. Such, at least, the pulse is observed to be in young robust persons, affected by carditis, or pericarditis. At other times, by force of these same inflammations, the pectoral pulse always takes place, but this pulse is, in weak persons, or in those of a weak constitution, rather small, convulsive, hard, and particularly irregular and concentrated, so much is the character of the various and different diseases of the human body influenced by the physical state of man, or the mode of being of his vital powers.

It is equally embarrassing to determine whether the patient is afflicted by pulmonia or pleuritis: for, besides the circumstance that both inflammations are derived from the same causes, and accompanied by the same signs; there is also this other peculiarity, that the pectoral pulse shows itself equally hard, tense, strong, and frequent, when the above diseases are of an hypersthenic character, and attack young persons or adults; otherwise the pectoral pulse is small, hard, concentrated, and frequent, such as it is found when the above inflammations are false, spurious, or hyposthenic, and attack persons of a delicate or weak constitution. It does not,

therefore, appear, from what we have hitherto remarked, that there is in practice a sure sign for characterizing, under every circumstance, the pleuritis, or pulmonia, for the inflammation of the pleura is seldom found to exist unaccompanied by that of the lungs, and *vice versa*. For the opinion, although a most ancient one, which still obtains in medicine, that the pulse is hard in pleuritis, and soft in pulmonia, is not generally confirmed by practical observation. Thus, it appears probable, that such an opinion arose from the inadvertency of observing the hard pulse in the period of irritation of pleuritis, and the soft one in the critical course of pulmonia.

Besides, it is well known that the patient experiences an acute and poignant pain in the right or left side of the breast, as well in pleuritis as in pulmonia; that its strength and intensity increase in the inspirations, which become shorter and more frequent in the efforts of the cough, most often the dry one, or that which is accompanied with little expectoration, which cough occurs as well in the one as in the other disease; that the respiration becomes also painful and difficult above all in the period of irritation, during which the pectoral pulse exhibits itself, as we have said, hard,

tense, strong, and frequent; and it has only been the above inadvertency of having observed the soft pulse in the critical course of pulmonia, and the hard one in the period of irritation of the pleuritis, which made Galen, Actuarius, Aëtius, Alpinus, and many other excellent physicians, both ancient and modern, believe, that the hardness of the pulse indicated pleuritis, and its softness pulmonia: and although the pain be deeper, and the respiration shorter and more difficult, in this than in that, nevertheless the patient has great difficulty in indicating, from the intensity of the pain, the profoundness of the seat of the one or of the other; the more so, as both of them can extend their seat from one to another part of the breast, or conceal the intense degree of pleuritis, which is accustomed to mask itself under the form of pulmonia.

But, whilst we ingenuously confess, that in certain cases of organic affections and phlegmasies, the information afforded by the pulse is not sufficient to point out properly their species, and to ascertain exactly their seat, the sphygmical science is not the less useful in guiding the physician in the treatment of them: for the deciding and determining whether the disease which afflicts the patient, be

the ossification of the right or of the left ventricle of the heart, or the dilatation of the one or the other, is a secondary affair ; since this knowledge does not directly relate to the object of the indication, it being well known that the one or the other affection of the heart is an effect, not a cause. Instead, therefore, of wandering to no purpose, amid the doubts and obscure subtilties of the old school, without ever arriving (or if we do, with difficulty, or, at least, too late) at a certain knowledge whether the one or the other ventricle, or this or that auricle of the heart be dilated, ossified, or otherwise affected, how much better would it not be to set about opposing the progress of similar organic affections, by moderating their strength by the most efficacious remedies suggested by Hygiene, more than by practical medicine ! The more so, as in all the above-mentioned organic affections of the heart, the same remedies are well indicated. Rather than accelerate the course of such local disorders by vainly boasted specific remedies, how much more regular would it not be to confine ourselves to the simple observation, in the actual state of science, for is it not the regular method of life which should form the basis of the plan of cure ?

It is necessary rather to learn from the pulse the presence of one or other organic affection of the heart; but it is not equally so to lose one's self amidst chimeras, uselessly attempting to individualize the species, and to ascertain the exact seat of the disorder, which, as we have before observed, is a secondary object; and in the actual state of the science, perhaps, mere curiosity. And of what use is the other attempt to determine exactly whether it be carditis, or pericarditis which afflicts the patient, since the indication is the same, and the actual state of science does not allow it? The evil would certainly be a serious one, were we to take the local diseases of the liver or spleen for those of the heart or lungs, as it has often happened that practitioners have prescribed remedies for diseases of the lungs while the liver was affected: but no ill-consequence ensues from confounding carditis with pericarditis, as both have the same character and require the same treatment. Morgagni himself candidly confesses, that the cause of the intermittency of the pulse may exist in the organic affections of the heart, in those of the arterial trunks, or in the affections of them all: "*Cum pulsuum intermissio est,*" he says, "*non ab impedimento*

*“ aliunde profecto, sed a causa, quæ in corde
 “ ipso, aut proximo magnæ arteriæ trunco, aut ad
 “ alterutrum innoscatur, magni eam facere oportere, fatendum est. *”* But if the intermittency of the pulse cannot indicate whether the organic affection exists in the heart, or in the arterial trunks, or in all at the same time; the observer, nevertheless, perceives, by its light, the presence of the affection, and this is sufficient to enable him to oppose it by the means of art; for whether the organic affection exists in the heart, or arterial trunks, or in all at the same time; the indication is always the same in all these cases.

The pectoral organic pulse, of which we are now treating, exhibits itself hard, strong, tense, irritated, and frequent, in the hæmoptysis or spitting of blood, arising from plethora; and it is small, deep, tense, and frequent, in the hæmoptysis, proceeding from organic disposition which prevails in cachectic people of both sexes, and of every age; and when a certain quantity of blood has made for itself a road across the vessels of the lungs,

* See Morgagni de Sedib. et Caus. Morb. per anatom. indagat. epist. xxiv. art. 21. p. 219.

the pectoral pulse then becomes irregular, or intermittent.

The pectoral organic pulse, moreover, takes place in the catarrh, in which it shows itself irritated, full, and frequent, when the disease is violent or hypersthenic; and it is small, weak, and frequent, in the pulmonary catarrh, complicated with the adynamic fever. The pectoral pulse becomes irregular, intermittent, and convulsive, when to the other symptoms of the pulmonary catarrh is added the pain, more or less acute, of the breast; pain which increases in consequence of the efforts of the dry cough, followed by some expectoration of mucous matter.

In general, the more the bronchia of the lungs are obstructed with mucus, and the more difficult respiration becomes, the intensity of the pain increases in proportion, and the pulse consequently shows itself smaller, more irregular, more irritated, and more frequent; and its intermittency becomes always more pronounced, as is observed in the suffocating catarrh; so much so, that the respiration is then difficult, short, and noisy; and the intermittence of the pectoral pulse, together with the other symptoms, concur in showing the profound obstruction of the bronchia, which is often the result of

strong sanguineous congestions, or inflammations of the mucus membrane of the lungs.

The pectoral pulse is full, rather soft, and not at all irritated at the commencement of the hydrothorax; for, as the effusion of the serous fluid, which may take place in both the cavities of the pleura, does not alter, in any great degree, the order of the movements of the heart, upon which depends that of the beatings of the pulse, this cannot yet show itself irritated, as it afterwards does, always in conformity with the progressive accumulation of water in either cavity of the breast: thus, it is the irregularity of the beatings of the pectoral pulse which nearly points out the irregularity of the motions of the heart itself; because this organ can then no longer freely exercise its contractions and dilatations: the difficulty of breathing appears, and to this new cause the frequency and irregularity of the pectoral pulse is always proportioned.

But the dropsy of the pericardium is immediately shown by the manner of beating of the pectoral pulse, which, from the commencement of this disorder, manifests the existence of it by its smallness, frequency, concentration, irregularity, and intermittency; and these alterations of the pulse increase in proportion as

the water accumulates. The diagnosis of this disease is also elucidated by the practice of the percussion of the breast, according to Avenbrugger, or by the application of the instrument invented by Laennec. The fact is, that the water accumulates in the cavity of the pericardium, in consequence of acute or chronic inflammations of the serous membrane of that sac, or in consequence of an organic affection of the heart, the aorta, or of the lungs. However this dropsy may originate, its presence never fails to disturb the order of the movements of the heart, as well as that of the beatings of the pulse, which is therefore found to be small, frequent, deep, irregular, and intermittent; and these alterations, from the natural state of the pulse, always correspond with the difficulty of respiration, lipothymia, and with occasional threatenings of suffocation, which accompany this species of dropsy.

The pectoral pulse is hard, thin, convulsive, small, and frequent in the paroxysm of asthma, in which the dyspnæa, the hissing of the respiration, and various other signs of this kind, equally concur. The diagnosis and prognosis of the pulmonary phthisis are connected with the organic pectoral pulse which announces its

existence, and enables its termination to be foreseen: otherwise, recourse must be had to the means of distinguishing, at a glance, the mucus from the pus, which is not practicable when the pulmonary phthisis has not proceeded at least to the second period: and without being under the necessity of having recourse to the chemical agents proposed by the ingenious son of the learned Dr. Darwin, in order to discover the presence of the pus, which decides upon the perfect developement of the pulmonary phthisis, the pectoral pulse may be consulted, and the degree of the disease be deduced from it.

In fact, besides the hot and burning sensation which the observer's organ of touch feels whilst it is examining the beatings of the artery of a consumptive person, there likewise concur the rapid frequency and celerity of the beatings of the pulse, which are rather small, hard, quick, and somewhat irregular in the morning; and quicker, more irregular, and somewhat elevated in the afternoon: its eminence, which takes place in the central space of the pulsatile artery, elevates and manifests itself still more in succession; and the perspiration, with expectoration of pus and mucus, comes on in greater or less quantity in the

advanced period of the night : a certain obscure redoubling of some of its diastoles is felt, and this, united with the other attributes of the pectoral organic pulse, gives a certain and sure sign of the successive suppuration of the tubercles, or of the presence of the vomicæ. As to the melancholy apparatus of the external signs of the pulmonary phthisis, the excellent work of the learned Dr. Portal may be consulted with great advantage.*

* Portal, Observations sur la nature et le traitement de la phthisie pulmonaire.

OF THE ORGANIC INFERIOR PULSES IN GENERAL.

BEFORE we proceed from the superior to the inferior organic pulses according to the method we have proposed, and which appears more natural than artificial; it is necessary to remark here, amongst other differences, two essential ones, which have for their object to point out the limits or line of demarcation between the superior and inferior organic pulses. The first difference is, that the various eminences which form, as we have said, the essential, or mechanical characters of the various superior organic pulses become more and more elevated progressively, proceeding from the capital to the pectoral organic pulse, in which we observe the maximum of elevation, of which the pulsatile artery is capable in the morbid state; whilst, on the contrary, the small eminences which characterize the different inferior organic pulses become gradually lower, and smaller in proportion as they

descend from the pulses, which are connected with the affections of the organs of the middle, to those which regard the affections of the organs of the lower region of the body.

The other difference which distinguishes the superior organic pulses from the inferior ones is as follows:—The rhythmi or beatings of the superior organic pulses, are, as we have said, more or less strong, hard, tense, vehement, and more or less quick or frequent; instead of which, those of the inferior ones show themselves more or less weak, thin, deep, small, unequal, sometimes rare, and at other times frequent.

Four physical causes contribute to keep up the above-mentioned differences between the superior and the inferior organic pulses: these causes are, 1°. The eminent degree of sensibility of the superior organs. 2°. Their being more or less near the heart, the focus of life, or centre of the circulation of the blood. 3°. The distance, more or less great, on the contrary; of the inferior organs from the heart; and, in the fourth and last place, their more or less obtuse sensibility. In this state of things it will be impossible to doubt the justness of the principle elsewhere exhibited by us, that the shocks, or vibrations,

communicated by the heart to the arterial tree, with its contractions, must be, in proportion to the different distances of the various organs from the heart, more energetic, more efficacious, upon the superior organs, and, on the contrary, less forcible and lighter upon the organs and viscera of the epigastric region, and still weaker upon those of the lower region of the body; and if the organs and viscera of these two regions were not placed at so great a distance from the centre of the circulation of the blood, as they are; nevertheless, this advantage should not raise them to the rank of the superior organs, their structure being for the most part fragile, or spongy, and their sensibility in general obtuse: this is the reason why the inferior organs cannot feel and receive the vibrations of the heart with the same force as the superior organs do.

ART. V.

OF THE ORGANIC PULSE OF THE STOMACH, CALLED, ON THAT ACCOUNT, THE STOMACHAL PULSE.

THE first fact that we meet with to prove that the prominences of the inferior organic pulses, which indicate the affections of the viscera of the epigastric region, are little elevated, is found in practical observation. In fact, all the elevation which characterizes the stomachal organic pulse is reduced to a mere compressed hillock, which elevates itself in the arterial space between the index and the middle fingers in the form of a small pyramid, which, from its summit or top being as cut off, appears obtuse. The other quality of the stomachal pulse consists in the peculiar character of its beatings, which, from their being in a certain degree rigid and tense, leave upon the organ of touch an impression similar to that of a hard, and, as it were, foreign body; the arterial space appears to contract itself, to grow smaller, and become irritated; and

this spasmodic and convulsive state of the pulsatile artery, together with the above-mentioned pyramidal eminence, and its rigid and hard beatings, all concur in manifesting to the touch the presence of the local affections of the stomach.

The pulse accompanying nausea, or the approach of vomiting, is similar to this; with the difference, that the above-described pyramidal elevation, which is observed in the arterial space we have mentioned, between the index and the middle fingers, grows always smaller, and becomes somewhat round, on the access of vomiting, in which the pulsatile artery becomes also more rigid, thin, concentrated, and more convulsive: to these distinct attributes of the stomachal pulse, is joined the marked inequality of its beatings, and the vomiting takes place. The frequent opportunities of artificial vomiting which occur in warm countries, in which the use of emetics is more generally practised, conduce to the acquirement of an exact knowledge of the stomachal pulse, whose organic, mechanical or essential character, can be examined in those countries with great effect.

After this first example of the stomachal pulse, which is observed in nausea and vo-

miting, whether natural or artificial, it becomes necessary to observe that the above-mentioned pyramidal elevation does not always preserve the same place or situation in the arterial space; it sometimes inclines and tends towards the side of the index of the observer, thus shifting from the side of the middle finger, and in the same way the greater part of its action is felt on one side, and the least part upon the other: at other times, it does the contrary, for whilst it strikes with proportionate strength the side of the middle finger, it touches very slightly, if at all, the internal side of the index one. In the former case, the circumstance of the pyramidal prominence beating more against the side of the index, and less against that of the middle one, shows that the seat of the affection is in the pylorus, under the stomach, or in the middle of the great arch of the colon—that is to say, in a part more or less remote from the cardia; and in the latter it announces the seat of the affection to be in this superior part of the stomach—that is, the cardia—since the pulse acts more upon the side of the middle finger, and rather less upon that of the index. The more the elevation tends and inclines towards the side of the index finger, the more certain

is the sign that the seat of the affection occupies a lower place in the pylorus.

Thus, the case frequently occurs in practice, of seeing a change of the stomachal pulse into the pectoral one, according as its pyramidal eminence is circumscribed in the above space of the pulsatile artery, or exhibits itself under the form of an arch or small hill, in the central space of the same artery. This change from stomachal into the pectoral pulse, is precisely the effect of the seat of the affection, which shifts its place, while it abandons the stomach in order to attack the pectoral organs: and when the seat of the affections of the stomach extends itself towards the breast, or the intestines, there arises from this circumstance the combination of the stomachal pulse with the pectoral, or with the intestinal pulse.

Besides these variations of the stomachal pulse, proceeding from the different seats which the various affections of the stomach may occupy; there are also to be noticed those which have relation with the different character of its various affections. Thus all the *neuroses* of the digestive organs, which consist in so many peculiar diseases of the stomach,

alter its mode of existence and functions, and therefore produce the stomachal organic pulse, which in its turn becomes the index or distinct sign of the *neuroses*: now, as these diseases do not affect the stomach in the same manner, nor with the same degree of strength; thus it happens, that the stomachal pulse varies in the various *neuroses*, in proportion to the degree of alteration of the nervous system, and the circulation of the blood.

So that, without taking into the account the secondary sympathetic affections of the stomach, which make the stomachal pulse appear at intervals; we observe, by its constant existence, the variations of the idiopathic or primitive *neuroses*. In general, the pyramidal eminence which forms the distinctive character of the stomachal pulse is less elevated than ordinary in cardialgia, pyrosis, anorexia, and dyspepsy; in bulimy, pica, and spasm of the stomach; but when the patient has been severely afflicted, in the commencement of such evils, by intense and strong pain, so that there results the state of exaltation of the sensibility of the stomach, or the state of irritation of its villous membranes; in that case, the pyramidal eminence above-mentioned is rather pronounced. In the or-

dinary course of the above-mentioned affections, the beatings of the stomachal pulse are found to be small, concentrated, unequal, slow, and rare; and their smallness, concentration, inequality and slowness, or rarity, correspond to the degree of atony or weakness, in which apparently consist the various *neuroses* of the digestive organs: so that from the various degrees of elevation of the pyramidal eminence of the pulsatile artery, and from the degree of smallness, slowness, inequality, &c., of its beatings, may be ascertained the slightness or the intensity of the various hyposthenic affections of the stomach.

The gastritis, on the other hand, causes such a change in the stomachal pulse, as to render its mechanical character more pronounced; for, the inflammation of the stomach, in which the exaltation of its vitality, together with a sensible disturbance of its partial circulation, necessarily alters the general course of the humours,—completely develops the pyramidal eminence of the stomachal pulse, and makes it become more elevated, active, and pronounced, and its beatings more distinct. Thus the pyramidal eminence raises itself, and increases as much as it is possible in the hypersthenic affections of

the stomach, and *vice versa*. To the circumstance, in other respects so essential, of the greater elevation of the organic character of the stomachal pulse, is also added, in the above disorders, the agitation, rigidity, and tension of its beatings; but the stomachal pulse loses all its energy, and its pyramidal elevation is but little raised in chronic or hyposthenic gastritis, especially when this degenerates into a scirrhus of the pylorus, of the cardia, or of any other part of the stomach.

The stomachal pulse at one time alternates, and at another combines with the intestinal pulse, which is observed in bilious or gastric fevers, in the *cholera morbus*, and in gastric disorders. The reason of this observation is to be attributed to the mode of acting of the nausea, or spontaneous or natural vomiting, which generally attacks patients suffering under gastric fevers, at the commencement of such disorders, as well as in the hurtful action which these diseases exercise upon the vitality of the stomach and of the intestines, as appears from the apparatus of the symptoms which accompany them, and from the dissection of the bodies of persons who have died of similar gastric fevers; because these diseases leave behind, in the

tissue of the stomach and intestines, not a few traces of alteration, or organic injury, in the form of gangrenous spots: which explains the presence of the stomachal pulse, and of its combination or alternation with the intestinal one in gastric fevers.

And whilst we possess the advantage of being certain of the presence of one or other affections of the stomach, and of knowing their character through the means of the stomachal pulse, we also obtain another, that of not confounding them either with the symptoms of other diseases, or with the affections of other organs. And is it not to the presence of the stomachal pulse that we should refer the knowledge of the diagnosis of gastric fevers, since its presence enables the physician to distinguish them from all the other fevers which belong to different orders? And it should be noted, that most frequently it occurs in practice, that the same dispositions meet together in certain individuals; that the same causes concur in them, and that the symptoms are little, if at all varied, although the fevers by which they are attacked, belong to different orders. And is not the stomachal organic pulse that which distinguishes more distinctly the hæmatemesis, or vomitus cruentus

from hæmoptysis, or spitting of blood, in which, on the contrary, the pectoral pulse predominates? Finally, it is the tone or the merit of this or that organic pulse, which can enable us to decide and determine nearly, if this or that hemorrhage arises from irritation, and is active, or if it proceed from atony, and is passive.

ART. VI.

OF THE ORGANIC PULSE OF THE LIVER, OR HEPATIC.

ANATOMICAL order would require that the examination of the stomachal organic pulse should be immediately succeeded by the description of the intestinal one, the intestinal tube being but a continuation of the stomach or ventriculus; but, it being more important for the good of the science, to follow, step by step, the successive degradations of the small eminences belonging to the different inferior organic pulses; for this consideration, not to lose sight of this knowledge, we intend to examine, first, the hepatic and splenic pulses, as those organic pulses which have much affinity with the stomachal one; so much the more so, as the liver and the spleen are both of them, together with the stomach, comprised in the epigastric region, whilst the greater part of the intestinal canal is contained in the lower region of the body. The relation of

vicinity between the stomach, the liver, and the spleen, is so efficacious, that it would be vain to endeavour to obtain a perfect knowledge of their organic characters, without previously taking a view of their successive degradation, proceeding from the stomachal to the hepatic pulse, and hence to all the other pulses of the middle and lower region of the body. Lastly, it must be observed that the eminences which characterise the above-mentioned pulses, almost all exhibit themselves in the arterial space, which they occupy between the index and the middle fingers, as we shall shortly have occasion to see.

But although, as we have said, the above-named pulses exhibit themselves in the before-mentioned arterial space, each, nevertheless, is independent from the other. Thus, the liver which has a slow and languid mode of existence; which has not been raised by nature to that degree of vital activity or sensibility exhibited by the stomach; the liver which has a tissue rather soft and spongy, evidently different from the membranous and fine structure of the stomach; the liver which is placed in the right hypocondrium, and rather further than the stomach is from the centre of the

circulation of the blood ; the liver which possesses not the advantage of being revived, animated, or set in motion by the action of the arteries,—for, the ramifications of the *vena porta*, which replace them, want that power all these, and many other physical causes, which have a direct influence upon the liver's mode of existence, and its partial circulation, prevent this organ, when in the state of disease, from increasing, in any sensible degree, the course of the general circulation, so as to produce an elevation or a pyramidal eminence equal to that of the stomach : and whilst its pyramidal eminence is in fact smaller, more circumscribed, and therefore less pronounced than that of the stomachal pulse ; its rhythmi or beatings are more tense, more concentrated, and more deep than those of any other pulse. After these general ideas, it may not henceforth be difficult to determine, with some certainty, when the pulse is stomachal, hepatic, or splenic, notwithstanding that all these three pulses exhibit themselves in the same arterial space, and all three under the form of a pyramidal eminence, more or less circumscribed, obscure, or superficial.

The hepatic pulse is also distinguished from

the stomachal one; first, because the pyramid which raises itself between the index and the middle finger, in the organic affections of the liver, is rather less pronounced, less active, and less lively than that which characterizes the organic pulse of the stomach; secondly, because, whilst on the one hand the pyramidal elevation of the hepatic pulse is more circumscribed, smaller, and more superficial and rigid than that of the stomachal pulse; on the other hand, the pulsatile artery which produces it, does not fail to appear more tense, thin, and concentrated, and to operate its beatings without energy and without strength, since those beatings are small, deep, weak, unequal, and more or less slow;—with another remarkable difference, viz. that the pyramidal elevation of the stomachal pulse shows itself in both the radial arteries, whilst that which characterizes the hepatic pulse, here treated of, is only found in the right radial artery, which exactly corresponds with the side of the body affected.

The principal variations to be noted in the hepatic pulse are reducible to two; to that which arises from the inflammatory state of the liver, that is, of the hepatitis, and to

that which has relation to the chronic and organic affections of the same organ. Both these variations exhibit themselves in the above-mentioned space of the pulsatile artery, under the form, as we have said, of a pyramidal eminence; but it must here be observed, that the said pyramidal eminence raises itself completely in hepatitis, and imperfectly, so to speak, in the organic and chronic affections of the liver: the circulation of the blood in the *vena porta* is sensibly altered in the presence of the inflammatory state of the liver; the exaltation of the sensibility, although obtuse, of this organ, contributes to it, and by this double cause is nearly determined the more sensible elevation of the pulsatile artery in the above-named space: in this case, the beatings of the hepatic pulse become more distinctly rigid, tense, unequal, and rather strong, especially in the first period of hepatitis, and of the jaundice which succeeds certain violent fits of anger, rage, or contempt.

The other variation of the hepatic pulse which has relation with organic and chronic affections of the liver, in which all the effects of the long continuance of such diseases con-

spire against the strength and vital properties of that organ: this other variation, we say, of the hepatic pulse, corresponds to the smallness of the pyramidal eminence, which rises there incompletely or slightly; coincides with its small activity, and weak or slow manner of beating, and its re-action rather yields to the slightest degree of pressure of the exploratory organ; so that its elevation is easily obscured with its beatings. The whole of the arterial space which is compressed by the four fingers of the observer's hand, is visibly thin, concentrated, and much more deep than it appears in the hepatitis, and its beatings exhibit themselves there proportionately weak, small, slow, and unequal. Under this form, in fact, appears the hepatic pulse in liver obstructions of long date, and in the biliary concretions of its ducts, in abscesses, in scirrhus, and in jaundice arising from some organic vice.

The hepatic pulse may be combined with the stomachal, the intestinal, or with both at the same time, and also with the capital pulse, although this latter belongs to the section of superior pulses. It meets and combines with the stomachal pulse in the scirrhus of the pylorus,

and in the abscess of the liver ; for, both these organic affections may exist in the human body at the same time ; it is united with the stom-achal and with the intestinal pulse in bilious or gastric fevers, whose seat is generally found to extend along the stomach, the intestines, and the liver ; and finally, the hepatic pulse may also be accompanied by the capital one, as is observed in wounds, fractures, and bruises on the head, which generally re-act upon the liver, and which sympathetically excite and disarrange its functions, as is attested by Hippocrates, Desault, Pinel, and many other classical writers, who all agree that the above-mentioned organic affections of the head re-act upon the liver, producing sometimes inflammation. Another species of affection capable of giving rise to the hepatic pulse, which is therefore found with the capital one, takes place in the presence of wounds or fractures of the cranium.

When once a correct idea has been obtained of the character and variations of the hepatic pulse, which Baillou erroneously makes to consist in the smallness and concentration only of its beats ; it will then be easy to see, by the assistance of its character, how difficult it

would be to mistake, as some have done, the affections of the liver, and above all to attribute to this organ the diseases by which it is not attacked, or to believe that some organic affections reside in the liver, whilst they are more often seated in the lungs. “C’est ainsi,” says Pinel, “qu’on a attribué faussement au “foie des lésions dont les poumons étoient “le siège.”* And how often it happens in practice, to attribute to the lungs certain affections of the liver! In three cases we have seen abscesses of the liver taken for the pulmonary phthisis. The circumstance of the abscess of the liver being preceded by the dry cough, and followed by the excretion of copious and frequent mucous and purulent spitting, of every colour and consistency, imposes sometimes upon practitioners who have not great experience, since that local affection of the liver assumes completely the appearance of the pulmonary phthisis advanced in its last periods. Now these fatal mistakes disappear immediately, when we reflect that the organic affections of the liver are indicated by the presence of the hepatic pulse, and those of the lungs, by the

* Pinel, Op. Cit., t. 2. p. 496.

observation of the pectoral one. So interesting and important are the lights diffused by the doctrine of organic pulses over the diagnosis, prognosis, and the true treatment of the various affections of the organs of man.

ART. VII.

OF THE ORGANIC PULSE OF THE SPLEEN.

IN the same arterial space in which exists the organic character of the hepatic pulse, is likewise observed that of the splenic one, which has reference to the spleen. In fact, a pyramidal eminence constitutes the organic character of the splenic pulse ; but its eminence differs from all others which refer to the various inferior organic pulses, inasmuch as it is not entire and complete ; since its anterior part, which corresponds to the internal side of the index finger of the observer, appears as if vertically cut, and at the base of this longitudinal section is observed a kind of cavity or small trench, which deprives it of a regular form, and consequently makes it incomplete ; whilst its other part, which relates to the internal side of the middle finger, is free from it. In every two, three, or four diastoles the pulsatile artery beats irregularly, and its beatings are less tense, less concentrated and

thin, than those of the hepatic pulse. To these we may add another peculiarity of the splenic pulse, that, whilst its pyramidal eminence is, as we have said, incomplete, it is distinctly observed in the left radial artery, which corresponds to the side of the body affected, and generally not at all on the right.

Now it becomes necessary to ascertain in what manner nature effects, in the presence of organic affections of the spleen, an eminence so incomplete and shapeless, as that which constitutes the distinctive character of the splenic pulse. In the first place we must remark the shapeless figure or conformation of the spleen, to which is most frequently joined the different degrees of increase of its bulk for every slight cause; and these physical dispositions, which consequently oblige its partial circulation to be exercised with difficulty, cannot allow its affections to operate a uniform and complete alteration in the general circulation, and hence, we repeat, the imperfection or want of uniformity itself of the pyramidal eminence of the splenic pulse. Besides which, all the most distinguished anatomists agree that the internal structure of the spleen is ignoble and unfinished; and, so true is this, that we are still ignorant what

is its office or use. But that which is most important to be known upon this subject, is that the profound and marked obtuseness of the sensibility of the spleen does not even allow it to become inflamed, for it appears that its inflammations are circumscribed to that part of the peritonæum by which it is covered and clothed; since it has not yet been ascertained whether the tissue properly belonging to the spleen can be directly affected by phlegmon, or can give rise to an abscess. Practical observation has hitherto pronounced nothing certain upon this particular subject.

Now it would be useless to fix our attention upon the difficulty with which the vibrations of the heart, whose energy is in the inverse ratio of the distances of the various organs from the heart, arrive at the system of the circulation of the spleen; and arriving, in consequence, feebly and incompletely at the spleen; it naturally follows that the organic character of the splenic pulse is shapeless: but it does not therefore the less indicate, by its half-articulated expressions, the pathological state of the spleen, nor discover, at the same time, the presence of its organic affections.

In fact, whilst the splenitis exists, the sple-

nic pulse also takes place, which in its turn announces the existence of it. The organic character of this pulse varies also as the affections of the spleen vary. In general the splenitis, whilst it is rare, scarcely ever becomes so intense as to be violent: this does not however prevent its various degrees of intensity from being indicated by the variations of the splenic pulse, to which variations also contribute the circumstances, although secondary, of age, sex, temperament, and state of the vital powers. Now all the variations of the splenic pulse are reduced to two; to the greater or less degree of elevation of its pyramidal eminence, and to its mode of oscillating with greater or less force. Its eminence is more sensible, and its beatings become more marked in splenitis and in the other hypersthenic diseases of the spleen, and *vice versa*.

The organic alterations of the external membrane of the spleen, which may become cartilaginous; its internal structure, which may be obstructed by calculi, or by concretions more or less hard and solid; its complete induration, and the state of being sometimes found much relaxed; all these organic alterations of the spleen are announced in a general manner by the presence of the splenic organic pulse. When once

the medical practitioner is assured, by means of the splenic pulse, of the existence of this or that affection of the spleen, he can have recourse to the other means of art, to determine, if possible, its species; and if the pathological examination of the affection be fruitless, it will be advisable not to risk the fate of the patient upon the attraction, always deceitful, of hypothesis. The fact is, that in the last analysis, there is no difference in the indication of the various organic affections of the spleen: their treatment, nevertheless, requires certain peculiarities, which at least concern the patient's manner of living, which may oppose the progress of those affections.

The presence of the splenic pulse in intermittent fevers is also noted by means of the swelling of the spleen, especially when in order to suppress them recourse has been had to bark, before preparing the body of the patient by previous means of art. A similar phenomenon of the swelling of the spleen takes place also in damp and marshy countries, where the heavy and stagnant waters increase its bulk. The splenic pulse also shows itself in the course of certain adynamic and puerperal fevers, because these most frequently extend their seat as far as the spleen, and modify its

natural state, as is proved by the organic alterations which they leave in the tissue of the spleen of persons dead in consequence of those fevers. And whilst this knowledge tends to distinguish the effects from the causes which produce them, it likewise secures the mind from the error of taking the pyramidal eminence of the splenic pulse for an irregularity of the pulse of those fevers; an error which might deceive us as to the true character of the diagnosis, the prognosis, and their treatment.

OF THE PULSES WHICH INDICATE THE AFFECTIONS OF THE
ORGANS OF THE LOWER REGION OF THE BODY.

THE pulses whose office is to manifest to the touch the affections which regard the organs and viscera of the lower belly, rightly belong to a kind altogether distinct from the preceding one; viz., that which comprehends the pulses of the organs of the epigastric region: for, the organs of the lower region of the body being placed at a great distance from the focus of life, or the centre of the circulation of the blood, the vibrations of the heart can only take place there very slightly. To the slightness of the beneficial effects of the vibrations of the heart may also be added the two-fold circumstance, that the structure of the viscera of the lower belly is mostly membranous, solid, and consistent, and that their sensibility is most frequently obtuse. It follows, then, from all these considerations, that the force of their affections cannot be such as to disturb the general circulation so much as

is necessary to produce the same eminences in the pulsatile artery, which characterize the pulses of the organs of the epigastric region.

To this state of things may be attributed the reason which does not allow the affections of the organs of the lower region of the body to produce the least trace of elevation, neither in the anterior or digital part of the pulsatile artery, nor in its posterior or brachial one. Thus, the pulsatile artery most generally contracts itself, becomes indurated, and concentrated, we will say even conceals itself, so as not to be observed without difficulty in the presence of affections of the organs of the lower belly. Every one has it now in his power to ascertain whether these pulses do or do not form a distinct kind from that of the epigastric ones: these, whilst they are never free from a certain organic, mechanical or essential character, which consists, as before observed, in an elevation or eminence, are not, however, so thin, deep, hard, tense, and rigid in the anterior part of the pulsatile artery as those which are observed in the presence of affections of the lower region of the body.

ART. VIII.

OF THE INTESTINAL ORGANIC PULSE.

To the species of the pulses of the lower region of the body, naturally belongs the pulse of the intestines; both because it indicates the affections of the intestinal tube, the longest portion of which is found placed in the lower belly, and because it is observed with the above-mentioned concentration in the digital part of the artery, which constitutes the distinctive character of the organic pulses of the lower region of the body. In fact, besides this concentration of the anterior or digital part of the pulsatile artery, which takes place in the intestinal pulse, and which is common to all the other pulses of the lower belly; there also concurs, in the character of the intestinal pulse, the other peculiarity, that in the above contraction or concentration of the digital part, there is felt in every diastole, a species of impression, which appears rather heterogeneous to the ordinary beating of the artery.

In the above-mentioned space of the pulsatile artery there is a foreign body, which at one time resembles a globule, at another a small bone, or rather more a small eel, which passes rapidly from the side of the middle finger to the tip of the index one, and which strikes it slightly with its head: thence, from the tip of the index finger, it departs rapidly, disappearing instantaneously, extending itself with the rest of the body towards the styloid apophysis of the radius, and consequently towards the hand of the patient. This unusual impression, felt, as we have said, by the tip of the index finger in every diastole, and the contraction or concentration of the digital part of the pulsatile artery, in which this phenomenon takes place;—both this impression and the contraction of the digital part of the artery, are, in fact, two distinct or essential characters of the intestinal pulse, which, as we shall shortly see, is observed in the presence of the various affections of the intestinal tube.

In the first place, the intestinal pulse exhibits itself in the enteritis or inflammation of the intestines. In fact, not only does the intensity of the impression, which is produced in every diastole by the head of the above-described eel upon the tip of the index finger,

vary in this phlegmasy, but also the time employed by the diastoles; since whilst these succeed each other, at one time slowly, and at another quickly, they vary in proportion to the character of the enteritis, which may be, as every one knows, true or false, hypersthenic or of contrary character. To this variation of the intestinal pulse contribute, although accidentally, the diversity of sex, age, temperament, and also the state of the patient's vital powers. *Cæteris paribus*, the character of the intestinal pulse is more pronounced in the true or hypersthenic enteritis, than in the chronic, spurious, or hyposthenic one: in the first case, all the space of the pulsatile artery exhibits itself agitated, its beatings are most frequently observed full, elevated, and quick, in its middle and posterior part, especially on the approach of the suppuration when this takes place; whilst the anterior or digital part of the same arterial space does not fail, as we have said, to show itself thin and concentrated. The above-mentioned impression, occasioned by the head of the eel, is felt under the tip of the index finger, and its beatings are more or less quick, unequal, and, at intervals, jumping. Now all these peculiarities of the intestinal

pulse, that is, the impression that is felt in the digital part, and also the beatings of that part ; the one is little sensible, and the others always show themselves smaller, thinner, more concentrated, unequal and slow, in chronic, spurious or hyposthenic enteritis : moreover, the beatings of the middle and posterior part of the pulsatile artery are not in this, as in the hypersthenic enteritis, elevated and full.

In short, the line of demarcation which divides the intestinal pulse of either species of enteritis is so marked, that, in many cases of certain chronic diseases of the lower belly, the beatings of the middle and posterior part of the artery are but little felt, and still less so those of its digital part ; for they exhibit themselves extremely thin, small, hard, concentrated, and unequal. It is necessary sometimes to press very forcibly with the fingers the digital part of the artery, in order to be enabled to perceive its beatings ; so thin, deep and unequal are they, as we have said, in certain chronic diseases of the lower belly : which circumstance induced Galen and Aëtius to make all the distinctive character of the intestinal pulse to consist in the concentration of the artery and in the inequality of its rhythmi or beats.

By the light of these observations, it will also be difficult henceforth not to recognise certain affections of the alimentary canal, in the presence of the intestinal organic pulse. At least, the knowledge of the intestinal organic pulse conducts to this advantage of practical medicine; for, the example is not rare in practice, at one time, of inflammation existing throughout the whole length of the intestinal tube, without serious symptoms resulting from it, or external signs capable of discovering its existence; at another, of this or that chronic affection without the least external sign indicating their presence; at another time there are certain organic diseases which happen without the possibility of their being indicated and discovered by symptoms not less obscure and equivocal than those which relate to the other affections of the intestinal tube: and if the knowledge of the intestinal pulse leads, as we have said, to elucidate and discover at the same time the diagnosis and the seat of the affections, of every kind and species, of the alimentary canal, we ask if the knowledge of the intestinal organic pulse is or is not of great assistance to practical medicine? The being able to discover, by its means, the presence of such masked and concealed diseases of the intestinal canal, through the

veil of their slightness, is certainly useful to the improvement of the art. The reason of this phenomenon, viz., the indifference of certain affections of the intestinal tube, for they do not alter its functions in any material degree, nor are followed by any external signs sufficiently clear and pronounced; the reason of this phenomenon, we say, arises from the natural character of the mucous membrane of the intestines; for when this is not seriously injured, or altered by certain organic affections, it gives no external symptoms, or if any one, this is extremely obscure and equivocal. A proof of this kind is found in the exposition of the subject of the conversation which took place between the celebrated Morgagni, and Albertinus, his master. "This exact and always accurate observer," says Morgagni, "inculcated to me, in my youth, the necessity of much circumspection and care when I had to treat pains in the intestines; for he, Albertinus, had seen many individuals unexpectedly die in consequence of slight pains in the intestines, being so carried off by a latent inflammation, and by the sphacelus which succeeded it, without any manifest fever, convulsion, vomit, or, in short, any material alteration in the physical or moral state of the patient.—Whilst Albertinus," continues Mor-

gagni, “ was relating to me such facts, I asked him by what signs he could predict the danger of such diseases. He answered that it was the state of the pulse, of the abdomen and the face.*” The fact is, that the signs which result from the state of the abdomen and the face, are also frequently fallacious; for they may refer to many other human infirmities; they may depend upon the affections of the stomach, and not upon those of the intestines; they may be sympathetic, and not pathognomonic; it is only the signs which are deduced from the presence of the intestinal organic pulse, that can and ought most clearly to discover the existence and character of the various affections of the alimentary canal.

From the merit, or degree of expression of the intestinal organic pulse, may in fact be seen whether the catarrhal diarrhoea and dysentery are the effect of some injury of the mucous membrane of the intestines, or merely arise from its state of irritation; for the intestinal pulse is not so thin, hard, unequal, active and agitated in the first, as it appears and is in the second case: in the one the head of the small

* Vid. Morgagni de intestin. dolor. Ep. 34 and 35.

eel is scarcely to be felt by the tip of the index finger, whilst it leaves there a distinct and relatively strong impression in the other case ; which leads us to distinguish the character of the various affections of the intestinal tube. Thus, it is curious, that in proportion as the fungous excrescences, which are usually produced in the alimentary canal, occupy one or more portions of the small or large intestines, the intestinal pulse is more or less inferior ; that is to say, more deep, thin, small, hard, and more unequal, when the before-mentioned excrescences occupy the larger intestines, and *vice versa* ; which in other words leads us to the knowledge of the special seat of the above-named organic affection. The symptomatic affections of the alimentary tube, which are very numerous, are also distinguished from the idiopathic or primitive ones, by means of the intestinal pulse ; for, in the former affections, the intestinal organic pulse either does not exist, or appears at intervals, or its organic character is slightly pronounced : thus, in whatever form this is found, it is never separated from the pulse of the organ, or the organs properly affected ; whilst the intestinal pulse represents the first part, and shows itself with its organic character perfectly

developed, and equally maintains itself in the idiopathic or primitive affections of the intestines, wherein it is found isolated from any other organic pulse, unless the patient be suffering from other organic disease at the same time: and it happens that the idiopathic affections of the alimentary canal terminate their course, and the intestinal pulse does not cease to exist, as is precisely the case in certain chronic diarrhoeas: this is a sign of some organic defect which has formed there in consequence of the long continuance of these or other chronic diseases of the intestines.

The organic intestinal pulse is very frequently accompanied by the pulse of the verminous, puerperal, adynamic, ataxic, and such like fevers. The cause of this combination of pulses exists in the irritation of the alimentary canal in the presence of various foreign substances which concur in the developement of similar fevers. The sensibility of the alimentary tube becomes exalted, and this exaltation, which is in proportion to the above-mentioned irritation, gives rise to the intestinal pulse, which disappears with the irritation by means of the

rejection of the foreign substances, which are the cause of it. Only in puerperal fevers the intestinal pulse maintains itself for a longer time, on account of the affections of the uterus, which sympathetically re-act upon the intestinal rectum. Besides, therefore, the advantage which is obtained in practice, of knowing, by the information of the intestinal pulse, the character and seat of different affections of the alimentary canal, we also derive that of distinguishing when its affections are idiopathic and when sympathetic.

Lastly, it will be proper to remark here the modifications and variations which the intestinal pulse exhibits in ascites, or dropsy of the abdomen. Before the ascites develops itself, one or other of the organic inferior pulses may predominate; for all experienced physicians, now, know that the ascites most frequently proceeds from the vices or affections of one or more abdominal viscera, and especially from the obstructions or alterations of the glandular lymphatic system; so that, from the presence of this or that organic pulse may be very often predicted the arrival or the developement of the ascites. One

amongst other observations which may be adduced in proof of this assertion, is found in the following case :

Two or three years ago, I was consulted by a gentleman of great ability in the law, who was suffering under a chronic and obstinate diarrhœa, which had bidden defiance to all the resources of art employed by the medical gentlemen attending him. The yellowish complexion of the patient, and the presence of the intestinal organic pulse, which was combined with the hepatic one, informed me at once of the state of irritation of the mucous membrane of the alimentary canal, and the affection of the liver. At the sight, therefore, of this pulse, I candidly predicted, what afterwards happened, unfortunately for him, that the ascites would certainly come on in a short time, if he had not recourse to mercurial frictions, which would not only hinder the ascites from developing itself, but, in my opinion, was the only means of art which could be useful and advantageous to him. The patient was erroneously dissuaded from it by contrary advice, and the ascites did not fail to appear in all its extent. Dr. Paris was then called in, who, with his accustomed candour, reprobated the error which had been com-

mitted, in not practising in time the mercurial frictions which had been so properly prescribed. The patient, in fact, died a short time afterwards ; and his death, which took place in consequence of the ascites, was another effect of the negligence of omitting to be guided by the light of the organic pulses in cases so complicated and difficult.

The intestinal organic pulse varies in proportion to the accumulation and effusion of the waters into the abdomen, in consequence of the above-named injuries of the viscera of that cavity or of the glandular and lymphatic systems. It must be remarked, that the intestinal organic pulse is not usually so hard, tense and thin, as it exhibits itself in the pulse which accompanies the ascites ; which caused Galen to observe, that the pulse of dropsical persons distinguishes itself by means of its hardness, tension, and smallness : these modifications of the pulse of the ascites are accompanied at one time by this, at another by that organic pulse, according as the ascites is the effect of this or that organic affection. The intestinal pulse, which may also with good reason be called visceral-lymphatic, is sometimes combined, in consequence of the effusion of the waters of the abdomen into the

cavity of the thorax, with the pectoral pulse, in the more advanced periods of the disease, in which the cough also takes place, followed, in fact, by a kind of expectoration : and from the obstruction of the organs of the breast in consequence of the ascites, necessarily results, as we have said, the combination of the intestinal pulse with the organic pectoral one.

ART. IX.

OF THE ORGANIC UTERINE PULSE.

THE object of the uterine pulse in the animal economy is twofold ;—to show the existence of the local affections of the matrix, and to announce the approach or the presence of the menstrual purgations. Under this view, the uterine pulse has much relation with the hemorrhoidal and the nasal pulse, whose office is also double ; because the one discovers the local affections of the intestinal rectum, and anticipates the arrival of the hemorrhoidal flux ; and the other acts in the same manner, as it manifests the affections of the organ of smell, and foretels the nasal hemorrhage. This precaution was necessary in order to prevent any difficulty which might hinder us from acquiring a knowledge of the true character of the organic uterine pulse ; the more so, since, in order to accomplish this design, it is necessary, on account of their analogy, to

compare the uterine pulse both with the nasal and hemorrhoidal ones.

The organic uterine pulse, notwithstanding, differs from both the nasal and the hemorrhoidal: in the first place, it differs from the nasal pulse, in not having either its elevation or its strength; for, in order to feel sometimes the beatings of the uterine pulse, it is necessary to press strongly with the fingers upon the pulsatile artery, so deep is the pulse at that time: moreover, the posterior or brachial extremity of the artery does not elevate itself in the least degree like a small mount on the horizontal line of its digital extremity, for the whole space of the pulsatile artery always preserves its cylindrical form, only its digital part is close and circumscribed in the uterine pulse: but it does not exhibit itself flat and compressed in the form of a nervous riband, as it does in the nasal pulse; with this further difference, that the small round bodies which are apparently felt in both pulses follow each other with less celerity in the uterine pulse, and are not so well and so distinctly formed as in the nasal one. Thus it is clear, from the comparison of the uterine with the nasal pulse, that the characteristic features of the

one are not, *cæteris paribus*, so distinct, marked and expressive, as those of the other. As to the difference which distinguishes the uterine from the hemorrhoidal pulse, it is sufficient to remark, for the present, that instead of feeling the impression of so many small round bodies in the digital part of the pulsatile artery in the presence of the hemorrhoidal pulse, there is felt that of a species of quivering, tremulousness or agitation. In its proper place, when we come to treat of the organic hemorrhoidal pulse, we shall show more distinctly the boundaries which separate all the pulses above mentioned, although closely resembling each other.

From what has been advanced in general upon the difference of the individual characters of the above pulses, it will be evident that all the organic or mechanical character of the uterine pulse is reduced to the twofold circumstance already mentioned, that the digital part of the pulsatile artery is close and concentrated, and that in this part is felt the impression of so many small round bodies which appear to succeed each other with a certain degree of velocity. Now, the expression of this mechanical character of the uterine pulse varies, together with the intensity of the

local affections of the uterus, and also with the age, physical constitution and state of the vital powers of the females who are attacked by them. The principal variations of the character of the uterine pulse may, however, be reduced to three, although between them there exist gradations of form, which may deceive at first sight, and cause it to be supposed that their variations are multiplied.

The fact is, that the above-mentioned round bodies which are felt, as we have said, in the digital extremity of the pulsatile artery, and properly under the tip of the index finger, appear more distinct and more marked, and proceed with greater velocity, in hypersthenic affections of the matrix, and *vice versa*. The other peculiarity which accompanies the mechanical character of the uterine pulse in hypersthenic affections of the matrix, is the state of irritation, more or less sensible, of the whole arterial pulsatile space, which appears as if it were rendered more severe by the presence of the organic affections of the uterus, and its beatings are then agitated and frequent, and become elevated with a certain reduplication, which is much more sensible in the active uterine or hypersthenic hemorrhage.

Nearly similar to the pulse above described is that which indicates the presence of the metritis or inflammation of the matrix, and also the existence of the active hemorrhage of the uterus, in which, as we have before observed, the artery is more or less irritated and tense. The uterine pulse shows itself, although cursorily, in amenorrhœa, or suppression of the menstrua, at the approach of the periodical time in every month; and its mechanical character is more expressive in young and plethoric women, or those of a thin constitution, and less so in fat females and those advanced in years.

The second variety or species of the uterine pulse is observed in the chronical or asthenic metritis, in the passive menorrhagia, in organic injuries of the matrix, such as the cancer, internal polypus, the various mucous excrescences of the internal membrane of the uterus, and many others which result from the alterations of the fibrous tissue of the uterus. And it must be remarked, that it is extremely important to the improvement of practical medicine, to be able to know, from the organic uterine pulse, the presence of the local affections of the matrix, the other external symptoms being very often scarcely, if at all, adequate to give

even a suspicion of their existence; since the pains, for the most part obtuse, generally felt by the patient in the lower region of the body, and the reversed order of the menstrual purgations, symptoms only which accompany them in the place of external signs, are not such as always to indicate their presence; since not only these obtuse pains, but also the reversed order of the menstrual purgations, may arise from other causes. The case is, however, different, when the organic pulses are taken for a guide; for when it happens, as is often the case in practice, that a female complains of obtuse and deep-seated pains in the hypogastric region, the medical practitioner can easily ascertain their cause, by studying the patient's pulse; for, after a course of multiplied researches upon the character of the organic uterine pulse, it has been found, that this is more or less small, languid and concentrated, in the presence of chronic or hyposthenic affections of the matrix; that the artery then appears as if empty of blood; that the impression of the small round bodies, which is distinctly felt, as we have said, in the inflammation of the matrix, is sufficiently sensible in the mucous excrescences, in the cancer, or in the polypus of the uterus, or

rather there is felt instead, in the digital part of the pulsatile artery, a kind of granulous *formication*: but whether the one or the other be observed, there is nevertheless found in this character of the uterine pulse the guide which conducts to the knowledge of the hyposthenic affections of the uterus.

The round bodies which constitute the distinctive character of the uterine pulse are observed to be smaller and less formed in the presence of the *lochia*; and with this difference, that its rhythmi show themselves for the most part unequal. At one time they are quick, elevated and hard; and at another, slow, small and hard, as if the uterus still felt the effect of the pains of parturition, or as if nature wished to show, by the weakness of the beatings of the uterine pulse, the other effect of the general disturbance which takes place in the female system at the time of parturition. Less expressive still is the mechanical character of the uterine pulse in the affections which physicians call the white flux, the flowers, or *fluor albus*, in the course of which the arterial pulsatile space is found to be for the most part thin, while its beatings become softer and obscurely redoubled at intervals. In this affection the mechanical cha-

racter of the uterine pulse consists in a slight or barely sensible granulous formication, whose degree of slighness is in the inverse ratio of the youth and excessive sensibility of females.

The third and last variety of the organic uterine pulse takes place in pregnancy, which represents in the plan of life a phenomenon *sui generis*. The first thing to be observed in the uterine pulse is the contraction of the pulsatile artery, accompanied by the smallness, frequency, and also inequality of its beatings; and this mode of being of the uterine pulse is derived, in the first place, from the suspension of the menstrual purgations, and consequently from the state of plethora resulting from it, and which in a certain manner hinders the ventricles of the heart from completely contracting and dilating themselves, on account of the crowding thither of the sanguineous waves, conveyed without any order by the *venæ cavæ* and the pulmonary veins into its auricles, whence result the frequency, the smallness, and the irregularity of the *rhythmi* of the uterine pulse in the first period of pregnancy.

Hence, in proportion as the foetus developes itself and increases in size, which takes place

in the second, and still more in the third period of pregnancy, at the expense of the mother's juices, the pulse then endeavours to manifest itself, and becomes successively elevated in proportion; and in doing this the uterine pulse succeeds in acquiring all the developement displayed by its mechanical or organical character, in the more advanced months of pregnancy. This developement of the character of the uterine pulse is owing to the organic law, that the mass of the blood decreases, and consequently the state of plethora of the pregnant woman is lessened, in proportion as the physical and urgent animal wants of the fœtus become augmented with the increase and developement of its body; and to this also is to be attributed the change of the uterine pulse, which from small, frequent and unequal, becomes, by the free and complete contractions and dilatations of the ventricles of the heart, and by the successive disembarassment of the blood-vessels, great, moderately frequent, and more or less regular in the successive months of pregnancy. In these there no longer exists the same contraction of the pulsatile artery, since that state of irritation, tension or spasm, caused in the uterus by the arrival of the

germ, at the moment when, in fact, the uterus preserves all its natural sensibility, ceases ; for the uterus, becoming by degrees accustomed to its burden, no longer receives from it so lively and strong an impression.

In addition to the improvement of the state of the pulsatile artery, and of its beatings in the more advanced periods of pregnancy, there is also to be observed at the same time another essential circumstance ; viz., that the small round bodies are found to be more distinct and more sensible in the digital part or anterior extremity of the pulsatile artery, especially in primiparæ, and in women who are thin and of great sensibility ; so that from the degree of expression with which the mechanical character of the uterine pulse pronounces itself, and from the degree of strength of its beats, may be judged more or less, and approximatively, in what period of pregnancy the female is.

The present is likewise the proper occasion for determining, as far as the state of science permits, whether it be possible or not to predict, by the light of the organic uterine pulse, the sex of the foetus, in the above second period. For this purpose we shall

here point out the means, presented by nature, in order to determine this important point of the sphygmical art.

One among the other means which nature affords, in order to convince us that it is not wholly impossible to predict the sex of the foetus, is to be obtained from the division of the uterus into two equal parts; a division which appears made by nature herself, and upon which all ancient and modern writers are agreed. Hippocrates, Esidius, Pliny, Zachia, and many other equally eminent physicians, all assert the binary form of the uterus. Bavinus mentions a lady who gave birth to a dead foetus, which wanted a cranium; and ten weeks afterwards, the same person produced another living and perfect child, a circumstance which could not have happened unless we suppose that each had resided in a different half or cavity of the uterus. In support of the binary form of the uterus, we have also the famous case reported by the celebrated naturalist Buffon, of a lady in Charlestown, in South Carolina, who in 1714 had twins, one of whom was black and the other white: which proves that the uterus of this person was divided as by a curtain into two cavities,

as has been remarked by Bavinus, Sylvius, Riolanus, Haller, and many others.

The other proof in favour of the binary form of the uterus results from practical observation; for we see that the external signs of both affections of the matrix take place more often upon one, and less upon the other side of the lower belly, in proportion as the seat of the affection is limited rather to the one or the other half or cavity. The same may be said of the nasal hemorrhage which may take place in one nostril and not at all in the other; or of the poignant pain of the pleuritis, or of the pulmonia, which the patient feels in the right or left side of the breast; or of the hemicranial affection, which is most often confined to one side of the brain, the other being free from it; and thus we may observe of every organ and viscus belonging to man, which appear to be all separated as by a curtain, which divides them into two parts or halves; a curtain which is more visible in some, and less so in other organs. Aristotle also divides into two equal halves, not only the human body, but also all its organs and viscera.* Galen also remarks

* See Arist. lib. iii. de part. animal. p. 249.

upon this subject, that it is not known whether the hemorrhage of the uterus is brought about by the vessels of this or that side of the matrix.* Baillou advances, and strongly maintains, that the matrix is double, and that its right side may be affected, without the left being so : such, at least, we may gather from his own expressions. *Fieri enim potest*, says he, *ut intactis sinistris dextra laborent, uterus enim geminus est.*†

The other proof which tends to decide the question, whether or not the sex of the foetus may be determined from the pulse, exists in the pathological laws ; for we see that both the irregularities or the alterations of the pulse show themselves, *cæteris paribus*, more or less marked and pronounced upon the right radial artery, and little, if any, upon the left, or *vice versa*, in proportion to the affected or diseased state of the half of the organ exactly corresponding to the side of the pulse, which is more or less irregular, more or less altered.

There can be no doubt at all as to the probability of the binary form of the uterus ; it is

* See Gal. Comment. lib. vi. de mort. vulgar.

† See Baill. Consil. lib. ii. tom. 3, p. 51.

only respecting the second part of the proposed question, whether nature has destined one half of the uterus as an asylum for the male foetus, and the other half for that of the female one ; for admitting for a moment this in no degree extravagant hypothesis, there results from it the physical certainty, that by the light of the organic uterine pulse the sex of the foetus may then be predicted.

To the verification of the above hypothesis may contribute a determinate series of observations and researches ; the more so, as the opportunities of examining the pulses of pregnant women are very numerous, and as the latter are themselves anxious, rather than otherwise, to further this kind of researches. The only precaution to be observed in similar investigations, is not to contradict the great predilection which some pregnant women have for one sex, and the little, if any, they have for the other.

These observations and researches have occupied, in a great degree, the attention of many celebrated physicians of the last century, who, to speak truly, are divided in their opinion respecting the place of residence of the two sexes in the uterus of the mother. Some suppose that the male foetus resides in the right, and the female in the left half of the

uterus; while others, on the contrary, affirm that the former inhabits the left, and the latter the right side of the uterus. Among this number is the celebrated Cirillo, who, speaking of the changes of the pulse of pregnancy, thus expresses himself:—*Gravidæ mulieres*, says he, *vario gestationis tempore pulsum habent, omnino diversum. Primis enim mensibus parvus est in carpo, celer in cubito, dum insigniter premitur arteria, si pulsus apparet parvus et inæqualis, de tertio gestationis mense agitur; si celeritas augetur, in quinto mense mulier versatur. Hujusmodi pulsus in sinistro brachio marem, in dextro fæminam declarat.**

In this state of things, and previous to our making the least research, we have thought it indispensably necessary, before adopting either of these opinions, to follow the traces of Hippocrates, the great model for the followers of the observatory medicine.

It is true that the sphygmical art was in its cradle during the time of Hippocrates, and that, consequently, that profound observer could not obtain the fortunate result of predicting the sex of the fœtus by means of the uterine pulse; but it is not less true that Hippocrates had done it equally well by the mere

* See Cirillo *de Pulsibus*.

information afforded him by the external signs of pregnancy: in fact, every physician acquainted with this branch of medical science, knows that Hippocrates himself predicted to pregnant women whether their offspring would be male or female, by the following signs. When the face of the party was red, the right breast with its nipple enlarged, and the arterial and venous vessels of the right side of the body swelled more than usual; when he found these signs, he hesitated not to pronounce that the woman would give birth to a male child, and *vice versa*.

Following this precept of the first reformer of the medical art, we began to make many observations upon the pulse of pregnant women, with the sole intention of reconciling the external signs which induced Hippocrates to prognosticate the sex of the foetus, with the variations of the organic uterine pulse; and by doing thus for a certain course of time, we arrived at the result of verifying the possibility of predicting, in many cases, the sex of the foetus.

Our guide in this object, as far as the actual state of the science allows, consists in attentively observing for several minutes, at given intervals, both pulses alternately, of pregnant

women; and when the mechanical character of the uterine pulse is very expressive and much pronounced upon the right radial artery, and little or not at all upon the left, then it is a sign that the place of the foetus is the right half of the uterus, and that there is every probability the woman will have a male child, and *vice versa*. Sometimes the difference which is observed between the right and the left organic uterine pulse, during the state of pregnancy, is so sensible, that we cannot sufficiently admire and respect the infinite science of nature. At other times, however, the difference of the uterine pulse in the two radial arteries is so obscure, that the attempt to make the smallest prediction upon the sex of the foetus is extremely difficult, if not wholly impossible.

It now remains for us to make known to the learned reader the result of our researches, and inform him how far he may proceed, with some hope of success, but not with mathematical certainty. The actual state of science is yet too barren of fortunate and propitious consequences for us not sometimes to be led into false reasoning; for as yet we find no fact calculated to prove that nature has expressly destined the half of the uterus for the recep-

tion of the female foetus, and the other half for the asylum of the male foetus. Besides, the phenomenon of generation is still too mysterious for us to dare to deduce from it any new information, which might at least raise the mind to the point of fixing, in a positive manner, the prediction of the sex of the foetus.

Notwithstanding this, it is our duty to produce, at least cursorily, some cases in which the sex of the foetus has been predicted, in order that our successors, medical and surgical men and others, may continue to make new observations and researches upon this branch of the science of man.

The first case which afforded an opportunity of predicting the sex of the foetus, was during the pregnancy of the lady of Signor Raffaelli, of Naples, Counsellor of State, &c. At the instance of her husband, we examined the pulse of that lady; and after repeated observations of both pulses, we predicted that she would give birth to a male. To this opinion we were led by the difference we observed between the right and the left uterine pulse. The first sensibly manifested its organic character, but the latter not at all: and from the degree of elevation of the mechanical or organic character of the right uterine pulse, whilst

this character was as if stifled and insensible in the left artery, we made the deduction that the child would be a male ; a prediction verified by the event.

The second case of prediction of the sex of the foetus, was that of the lady of Dr. Whaley, a physician of this metropolis. To this lady we predicted that she would give birth to a daughter ; for whilst the mechanical character of the left uterine pulse was expressive and well pronounced, that of the right-hand pulse was scarcely sensible.

The third instance of the difference of the uterine pulse in the two arms, or in the two radial arteries, is that of a young American lady. This female, during her pregnancy, felt a painful sensation on the right side of the body, proceeding from the lower belly to the sole of the corresponding foot ; at the same time, the organic character of the right uterine pulse was in the greatest degree developed, pronounced and expressive ; and, on the contrary, that of the left pulse was extremely obscure : so that it was not very difficult to predict the event, that she would produce a male child, which she did at the usual time. It will be well to remark here, that the sensible elevation of the organic or mechanical

character of the right uterine pulse, as well as the painful sensation which extended along the lady's right side—both phenomena were the immediate effect of the pressure or movements made by the foetus in the right half of the uterus.

ART. X.

OF THE ORGANIC HEMORRHOIDAL PULSE.

To the presence of the local affections of the intestinal rectum is owing the existence of the organic hemorrhoidal pulse, which, according to what has been said in the examination of the uterine pulse, has much analogy, both with this and with the nasal pulse; for all three exhibit certain gradations of form and character which enclose them within a circle of reciprocal relations. To this law they are subjected by the uniformity of the functions which the above pulses perform in the animal economy; since, whether they announce the phenomenon of the hemorrhage; or whether they discover the various affections of the respective parts, or the respective organs to which they relate, we invariably find it to be the case that Nature employs nearly the same means to produce the same phenomena. Among other writers, Stahl remarks that the uterus and

the intestinal rectum are united together by ties not less intimate than sympathetic; and these, for evident reasons, contribute not a little to approximate the pulse of the affections of one organ to that of the affections of the other. It is also well known in how great a degree the uniformity of the dispositions exhibited by the blood-vessels of the uterus, nostrils, and intestinal rectum, concurs in the analogy of the uterine, hemorrhoidal, and nasal pulses; for in all these three organs the phenomenon of hemorrhage occurs. This is the origin of the analogy of the gradations and relations which enclose in a circle the nasal, the uterine, and the hemorrhoidal pulses, of which latter we are now treating.

The organic or mechanical character of this pulse may, in fact, be reduced to a kind of granular formication, more or less sensible: a formication which may be felt in the digital part of the pulsatile artery. At other times, as has been before observed, there are felt in the above-mentioned arterial space certain small round bodies, which move about with various degrees of quickness and force.

Notwithstanding this, however, as the uterus, the organ of smell and the intestinal rectum are not made after the same model, and re-

present three different organs, so it happens that certain modifications occur in their relative organic pulses, and these modifications are sufficient to determine the difference between them.

In fact, it is nothing but a kind of quivering, tremulousness or agitation, which is felt in the digital part of the pulsatile artery, and in which consists the mechanical character of the organic hemorrhoidal pulse; for the above-mentioned granulous formication, which is distinctly and sensibly observed under the tip of the index finger, as well in the nasal as in the uterine pulse, either does not exist in the hemorrhoidal one, or is so degraded as not to be confounded with that of the other two pulses; and when it happens that instead of the above granulous formication, the small round bodies are felt in the digital part of the pulsatile artery, they are so weak as to be stifled, and scarcely sensible in the hemorrhoidal pulse. Moreover, we know that both the uterine and the nasal pulses appear at one time in the right radial artery, and at another in the left one, in proportion as the affection occupies the right half of the matrix or the right nostril of the nose, or also the left half of both organs:

whilst this is not often the case with the hemorrhoidal pulse, whose organic character always shows itself more pronounced on the left than on the right radial artery, according to the result of practical observation.

The other peculiarity to be observed respecting the organic hemorrhoidal pulse, is that in certain plethoric individuals, affected by diseases of irritation in the intestinal rectum, the central space, or middle of the left radial artery, is found elevated and enlarged to such a degree as to contradict the mechanical character of the pectoral pulse: the digital part of the pulsatile artery does not, however, on that account, cease to operate its beatings, which are obscure, thin, and more or less deep. At other times, the whole arterial pulsatile space becomes uniformly thin, tense and deep, such as it may be observed in the organic hemorrhoidal pulse, occasioned by prolonged spasmodic pains in the intestinal rectum.

The organic hemorrhoidal pulse takes place in the hemorrhoides, whether internal or external, blind or open; in the black tubercles similar to mulberries, which are accustomed to form and vegetate in the interior of the intestinal tube, especially in the colon, and in the

intestinal rectum; or it may appear in the irritated fistula, from the use of stimulating remedies, or from other local causes. With respect to the modifications and variations of the pulse in question, which are connected with the desired crisis of the hemorrhoidal flux, we will take the opportunity of explaining them in the treatise upon critical pulses, in which it is more proper to make the comparison between the pulse which indicates the local affections of the intestinal rectum, and that which announces the approach or the presence of the hemorrhoidal flux.

ART. XI.

OF THE URINARY ORGANIC PULSE.

THE urinary pulse may perform two offices in the animal economy, that of indicating the presence of the local affections of the kidneys, the ureters, the bladder and the urethra; and that of announcing the approach of the copious critical fluxes of urine, which nature frequently operates in certain acute diseases, with the assistance of the organs destined for that purpose, as we shall have occasion to see in the treatise upon critical pulses. It will suffice to remark for the present, that the urinary pulse does not possess any mechanical character, or if it does, it is not such as to entitle it to a place among the other organic pulses properly so called. It may be said, that the pulsatile artery does not possess any external eminence whatsoever, and does not give any external sign of quivering, and much less of granulous formication, or of the small round bodies: at most it distin-

guishes itself by the mode of operating its beats.

The distinctive character of the urinary pulse is in fact indicated by the singular mode of performing its beatings; these gradually get smaller and smaller, to a certain point, and then return to their former mode of beating; another of their peculiarities is, that the first pulsation which comes after the last of those which have got smaller, recommences with the greatest force, and operates, as Fouquet says, with a certain jerk or explosion, so much so that it manifests itself with violence in certain copious fluxes of urine, as has been justly observed by Prosperus Alpinus, and many other ancient physicians.

The other peculiarity to be observed in the urinary pulse is, that its pulsations reach the organ of touch rather rigid, thin, deep, convulsive, and unequal, for they allow to be observed, at times, certain slight or short intervals of intermittence, which are especially pronounced in the strangury or retention of urine, occasioned by the spasm of the vesica, or by other affections of that organ. All these peculiarities of the urinary pulse are observed more distinctly in the left radial artery than in the right. But the case is different with the

urinary pulse, which indicates the presence of local affections of the kidneys; for its character shows itself more distinctly in the artery corresponding to the side of either kidney most affected. The same difference between the pulses of the two radial arteries is equally observed when a steatoma occupies or affects either kidney, for the character of the urinary pulse, which corresponds to the side of the kidney affected, is beyond comparison more pronounced than that of the pulse of the other side, when even this pulse is altered from its natural state.

The two circumstances concurring in the above pulse, in order to distinguish the character of the various affections of the urinary system, are the greatness and force of its pulsations united to their irritation and frequency: when the urinary pulse is in this state, it is then a sign that the above affections are of an hypersthenic nature, and *vice versa*. The character of the urinary pulse may be studied in nephritis, in which it is found developed in its fullest extent: thus the true knowledge of it is that which decides in certain obscure and fallacious cases, if the disease be really nephritis, or only a calculous affection of the kidneys.

Finally, the difference which distinguishes the organic urinary pulse from the critical one, is as follows :—The former, inasmuch as it arises from the state of irritation of the urinary system, in the presence of its various affections, must necessarily be more or less rigid, hard, convulsive, or more or less small and slow, in proportion to the hypersthenic or hyposthenic character of its affections ; and the latter, which arises from the regular efforts of nature, is more or less soft ; and its pulsations show themselves elevated and round. The other marked character which also distinguishes the organic from the critical urinary pulse, is that of seeing, that the first pulsation, which recommences, as we have said, after the last one of those which become smaller and smaller, is effected, in the second, with a certain impetus or explosion, and in the first without it.

ART. XII.

OF THE ORGANIC CUTANEOUS PULSE.

NATURE has also destined the cutaneous pulse to perform a double office,—that of announcing the approach or the presence of the critical sweat, and of discovering the local affections of the common integuments. In the former case, it takes the name of the wavy pulse, or the *inciduus* of Solano; and in the latter it is called by Fouquet the pulse of the cutaneous organ, or of the circumference of the body. The distinctive character of the cutaneous pulse is found in the reverse of the medal of the urinary pulse: for, instead of getting smaller and smaller, as the oscillations of the urinary pulse do, these, on the contrary, grow larger, and gradually become more elevated in the cutaneous pulse; at least, some of these elevate themselves upon the others, exactly as if they were desirous of imitating the waves of the sea, which has given

rise to the idea of calling it the wavy or undulating pulse. Neither does this possess any mechanical character, there not being found in the pulsatile artery any trace of those eminences which characterize the organic pulses properly so called. In other respects, nothing is more practicable than to distinguish the cutaneous pulse from all the other morbose pulses. Its beatings easily yield to the slightest pressure of the exploratory organ, so great are then the softness and flexibility of the pulsatile artery which effects them: now all these qualities predominate more in the cutaneous critical pulse than in the organic one.

The opposition which is observed between the pulse of urine and that of sweat, is also demonstrated by practical observation; for, when the urine is evacuated copiously, the exercise of the cutaneous system is almost inactive, and *vice versa*. The fact that the urinary system of the Russians is very active, and effects copious discharges of urine; while the Sicilians, the Maltese, and all the other inhabitants of southern climates, scarcely feel the want of making water once in the same period of time, is a still further proof of the opposition existing between the urinary and the cutaneous pulse, which both exhibit in

their respective functions. Besides, the cutaneous pulse, which is external, must, of course, be opposed to the urinary one, which is internal.

The organic cutaneous pulse predominates in the eruptions of the measles, the small-pox, and other similar exanthematic diseases, in which it arises from the heterogeneous humours being transported to the superficies of the body. Upon the approach of the period of the cutaneous efflorescence, an effect of the genius of such diseases, the organic cutaneous pulse, which announces and accompanies it, exhibits itself united with the celerity, force, and frequency of its rhythm: and thus continues more or less throughout the whole period of the hypersthenic state of the body; after which its character or its activity becomes somewhat weaker in the successive states, and from strong and energetic, as it is generally observed at the commencement of those diseases, it becomes altogether weak in their last period.

The cutaneous pulse is more frequently soft, slow, and rare in the anasarca, and in the leucophlegmasia, in which the white or serous humours insinuate themselves into the cellular tissue of the common integuments:

on the contrary, it is somewhat elevated and lively in the tetters, and in the leprosy, especially in warm climates, where these diseases, which establish upon the cutaneous organ a centre of irritation and afflux of humours, usually predominate.

From secondary causes the cutaneous pulse may be observed in certain fevers, which serve as a type developing, proceeding and declining, and in the period of the latter, the cutaneous pulse shows itself, which announces the approach of the symptomatic sweat ; it also indirectly takes place in the pulmonary phthisis, in which it shows itself more or less active in the afternoon, and announces the approach of the nocturnal sweats, which in quality of symptomatic sweats always shorten more rapidly the course of the disorder, and hasten the time of the patient's death. In all these and other similar cases, the cutaneous pulse does not show the existence of any disease ; it only announces the presence of some of its symptoms, which establish themselves in the cutaneous system, and with which the pulse is connected.

THIRD ORDER

OF

THE CRITICAL PULSES.

GENERAL IDEAS UPON THE DOCTRINE OF CRISES.

THE doctrine of the crises is so intimately allied with that of the critical pulses, which belong to the third and last order of our classification, that the attempt of obtaining a thorough knowledge of the character of various critical pulses, without first determining the nature of the crises, would be vain. It would be an inconvenience similar to that of treating upon organic pulses before acquiring a knowledge of the structure and functions of the different organs. Homogeneous and relative ideas have neither strength nor elegance, when not united and interwoven in a sort of system ; the mind cannot participate in

the progress of any science; the memory loses itself amidst so many isolated and divided ideas, and the whole edifice falls to the ground, when the various parts of which it is composed are not well arranged and firmly united together. Our intention, therefore, is to proceed from the knowledge of what physicians call crises, to that of critical pulses; since the one leads to or is in relation with the other.

For the purpose, however, of not wearying the reader, by overloading his memory with an explanation of all the minutiae and barren scholastic discussions with which the doctrine of crises has hitherto been encumbered, we shall confine ourselves to show who first introduced the crises and critical days; what physicians understand by crises; what are the opinions of the most eminent European physicians respecting them and the critical days; whether crises do, in fact, take place in chronic, and in all acute disorders, without exception; and whether it is right, in the present day, to adhere to the ideas entertained upon this subject by the majority of our contemporaries. Such are the principal objects necessary to be inquired into, before entering upon the subject of critical pulses.

In the first place, all the most distinguished physicians, of every age, agree that Hippocrates is the first who makes mention of the crises, and also of critical days; although it does not appear unlikely that Hippocrates borrowed the first notions of them from the Pythagorean philosophy. The fact is, that Celsus strongly condemns the ancient physicians, for having followed the philosophy of Pythagoras, and especially for having founded the system of critical days upon the dogmas of that school; a school which, as is generally known, sets the greatest value upon uneven numbers, which are for the ancients, as we shall see, the natural days of the crises.

At all events, we are certainly indebted to the venerable native of the island of Cos, for the observations of the crises upon the human body; observations which have, for the most part, been adopted by his successors. *Crisium typus*, says the anonymous author of the *Specimen novi Medicinæ Conspectus*: *Crisium typus dierumque criticorum ab Hippocrate traditus ordo.**

* Ann. 1751.

Hippocrates extended beyond its proper limits the meaning attached to the expression crisis. He applies the term crisis to every kind of excretion, comprehending under it the exit of the foetus from the uterus (as if it were not a natural consequence of pregnancy); and even the expulsion of a bone, or of any other foreign body from a wound. Every change which takes place in any disease whatever, without excepting its increase, declination, or degenerating into another disorder, is, according to Hippocrates, the result of a crisis. Besides, therefore, the defect of the definition given by him of crisis being too general, as he erroneously comprehends under it, together with so many other natural phenomena, that of child-birth; it does not also possess the advantage of distinguishing the natural course of a disorder, from the efforts made by nature to overcome it.

Hippocrates, also, fell into the other error of fixing the time of the crises to septenary days; that is, the seventh, the fourteenth, and twentieth, instead of (for what reason I know not) the twenty-first; as if the septenary or uneven days, which he borrowed from the Pythagorean philosophy, possessed a real

merit, a privative or intrinsic power over the production of the crises. Amongst other writers, Marsilius Cagnatus points out, with just discernment, the contradictions which are to be found in the works of Hippocrates upon the subject of critical days. We admit, it is true, that fine, or excessively cold days, exercise a certain influence upon the physical system of the patient, and consequently upon the acceleration or retardation of the crises; but not the critical uneven days, when we abstract the favourable dispositions of the patient, to which the approach of the crises should be attributed, rather than to the pretended privative virtue of unequal days, which, in reality, does not exist. Besides, it is Hippocrates himself who relates, in his books upon epidemics, that he perfectly cured Pericles, on the fourth day, of an inflammatory fever, in consequence of a copious sweat; that the ardent fever which attacked the daughter of Larissea, was correctly judged to be such by the nasal hemorrhage on the sixth day; that Methon was restored to health on the fifth day, by means of a flux of blood from the left nostril. . . . All these, and other similar accounts, given by Hippocrates,

are evidently in opposition to the supposed intrinsic merit of septenary days, and place him in contradiction with himself.

Numerous, however, notwithstanding, are the physicians, who have adopted the maxims of Hippocrates upon the crises; and few are those who reject them as an idle and fanciful thing. Of the number of the first is Galen. He makes the crisis to consist in a sudden change, either favourable or otherwise, of any disease whatever, and derives its cause from no other source than the ill-understood privative virtue of the critical days. And whilst Galen believes with Hippocrates, that the twentieth day is more critical than the twenty-first; Diocles, Archigenes, and several other ancient physicians, maintain, on the contrary, that the twenty-first day is more critical than the twentieth. From this we may at least deduce the inexactitude of the observations made by the physicians of antiquity upon crises.

Baillou, Baglivi, Stahl, Hoffmann, Boerhaave, Van-Swieten, Huxham, Solano, Nihell, Senac, Michel, Cox, Fleming, Fouquet, and many other ancient and modern physicians, have all followed, more or less, the dogmas of Hip-

pocrates and Galen upon the crises: we say more or less, because the definitions which they give of the crisis are in some degree different from each other. Some compare the crisis to a species of struggle or combat which takes place, according to them, between Nature and the disorder; others confound it with the efforts and excretions made by Nature, in order to expel the cause of the disorder from the human body; others assimilate it to a reduplication or excess of the vital action, which terminates in recovery or death; others do not believe it to be different from the effect of the last exacerbation of the fever, by means of which are mingled together the material cause of the disease, and the purulent humours which are thrown out by means of the circulation, and excretory vessels of the body. Of this opinion, among others, is Quesnay.*

Boerhaave, who calls the crisis *separatio morborum a sano*, makes it also to consist in a sudden change of the acute humoral diseases, which, he says, is observed in certain determinate times, and is followed either by the

* See Quesnay, *Traité des Fièvres*.

recovery or death of the patient.* Such is the opinion of several other eminent physicians of the past age, who equally admit the crises, and also the critical days.

In short, all the physicians who have followed the practice of Hippocrates, err at least in negligence, and remain, more frequently than they ought to do, inactive near the patient's bed-side, waiting till Nature alone decides upon the fate of the sufferer: a proceeding which cannot fail to lead them very often into serious errors.

It would, therefore, be a desideratum, that the walls of the modern medical schools should no longer re-echo the words, *natura medicatrix, expectatio, vel ars sanandi cum expectatione, et quo natura vergit*; not only in order to do away with the error of believing Nature to be an agent different from the phenomenon of life, that is, from its reaction, and from the organic laws which regulate its exercise; but likewise to reform the abuse of confiding, in all cases, the cure of the patient to Nature alone. In short, it is to this mode of thinking and acting that we owe

* See Boerhaave, in his *Institutes*, p. 931, 939, &c.

the satirical trait of considering the practical medicine of the ancients as the meditation of death.*

We do not, however, on this account, the less respect the many other labours of Hippocrates, which have conferred immortality upon his illustrious and worthy name; nor do we, on this account, refuse to admit the crises within the limits prescribed to them by observation, and as far as the actual state of science allows. The crises may arise, and be observed, here and there, in certain acute disorders, which nearly affect the humoral mass; at one time they are produced by means of sweats, as is most frequently observed in warm climates; at another, by means of the flux of urine, as is generally seen in cold countries; sometimes by means of the ventral flux, which more often obtains in damp and cold regions; and at others, by mucous or purulent spittings, which is witnessed indifferently in all climates and countries. But the idea of observing crises in all acute disorders, and in certain determinate days, is chimerical, and absolutely

* See Harvey's Satire, which holds up to ridicule the Spectatrix Medicine.

hypothetical. It is certainly of the first consequence in medicine, to foresee the crises, to follow and second them, when the pulse announces their arrival; but not to wait for them, while not the smallest precursory sign announces their approach, and whilst, on the contrary, there exists the most urgent necessity for employing the resources of art.

That it is not of the least utility to return, in the present day, to the antiquated ideas of Hippocrates and Galen, relative to crises, is sufficiently proved by their contradictions upon this particular subject, and by the following observations:—In the first place, it certainly is not of rare occurrence in practice, that most acute disorders terminate their natural course favourably, without the least token or sign of any crisis; that some fevers run through, in different individuals and in different climates, at one time a longer period, and at another, a shorter one, although they are of the same species; that the critical revolutions which usually arise in certain cases, are there produced and effected at different times, and not always on septenary days, indicated by Hippocrates and Galen; and finally, that it would not be so likely as some imagine, to determine, fix, and precisely ascertain, in all

cases, the first day of any disease, or the commencement of its attack: this, truly, may be easy, when the disease announces itself by the paroxysm of cold, or by some other sensible phenomenon, which makes it manifest either to the patient or to the senses of the practitioner; but not when the disease attacks a patient secretly, and in such a manner as not to be perceptible, at least till after a certain period of time. Neither, indeed, is this case of rare occurrence in practice.

Now who would dare to flatter himself with the hope of not falling into error, by waiting for the crisis exactly on the seventh, fourteenth, or twentieth day of the disorder, when he does not set off from a certain date; that is, from the day in which the disease began, or exhibited the first signs of its attack? The doctrine of the crises is therefore vague, obscure, uncertain, and subject to serious errors, when it is adopted in the sense in which it is understood by Hippocrates, Galen, and their disciples.

The assertion of the celebrated Baglivi, a follower of Hippocrates, that the crises are observed in countrymen who do not call in the assistance of physicians, does not invalidate what we have hitherto advanced, both

because Baglivi does not show by this, that the crises take place in all acute diseases, and that they always fall upon septenary or uneven days, and because he himself allows that there are in nature some diseases of a malignant character, in which it is useless to await the concoction, and consequently the crisis, which cannot be effected without being preceded by the concoction, which is the first operation of nature. Besides Baglivi does not fail candidly to confess, that the crises depend likewise upon the temperament, upon the character of the different seasons, and also upon the state of the atmosphere.

We may, now, be able to estimate the just value in practice of Boerhaave's precept, when he says:—*Hæc non fallunt quamdiu naturæ morbum committis, neque te immisces curationi.**

Therefore, whilst we reject, on the one hand, the hypotheses of the ancients upon the crises, which Asclepiades makes to depend upon the influence of the moon; which Stahl attributes to the power of the mind; which Hoffmann refers to the will of the Creator, and which others strangely attribute

* Boer. Inst. (942, Haller, Comm.)

to the action of the stars, or to the superabundance of the melancholic humour, as Frascator does; whilst, we say, we reject, on the one hand, these and all the other hypotheses, which turn upon the doctrine of crises of the ancients; we are also convinced of the non-existence of the absolute power of the septenary days, respected by the majority of physicians of antiquity; because, without insisting at length upon the ingenuous confession of Galen himself, we shall merely remark here, shortly, that the second Hippocrates of the vulgar era contradicts himself upon all that he first said upon the doctrine of his predecessor, in his tract upon the critical days. Amongst other things which he says upon this subject, he in one passage calls the Gods to witness, and protests that what he has advanced, said, and written, upon the critical days of Hippocrates, he did it at the request, and for the gratification of some of his friends. *

The worthy Aymen, who obtained the first prize given by the Academy of Dijon, in 1751, has determined better than any one, whether

* Gal. de dieb. crit. Cap. vi.

the critical days are the same in our climates as they were in those in which Hippocrates observed them, and of what value they should be considered in medical practice ; he has likewise proved, in his prize dissertation, that the crises may happen indifferently upon even or uneven days.* In support of the proofs adduced by Aymen against the absolute power of the critical days of Hippocrates, in his above-cited dissertation, we have the authority of the learned professor Richerand, who says, “ Je ne finirois point, si je voulois parler de tous ces mécomptes, et dire combien de fois les nombres tant célébrés, trois, sept, quatorze, vingt-un, n'ont amené aucun changement.”†

There do exist, therefore, critical days, that is, those in which the crises take place ; but not the others, which are erroneously believed to produce the crises, by virtue of the absolute power which they do not and ought not to possess over their production. In fact, the crises are the agents of the critical days, and never the

* See Aymen, Dissertation, &c.

† Richerand, *notic. sur la vie et les ouvrages de Borden*, p. x.

latter the cause of the former. The crises, as we shall see hereafter, are a work of Nature; and Nature herself does not differ from the product of all the organic functions, vital properties, and the laws which regulate the exercise of life. Now, as all these phenomena vary from one moment to another, by means of the character of the disease, and according to the climate, temperature, and an infinity of other partial circumstances; Nature, therefore, not being herself constant during the morbid state, cannot, consequently, produce the crises at any fixed day: the arrival of the crises is therefore purely accidental, because it may be accelerated or retarded by so many circumstances, which, as we have before said, vary from one moment to another.

The other point, not less important for examination, is that of seeing whether the crises do, or not, in fact, take place in chronical diseases. Hippocrates, Bordeu, and many other eminent writers, speak in their works of crises happening in chronic diseases. But when once the mind clearly possesses the idea which should properly be attached to the word crisis, it will not be a difficult task to prove that the crises do not in fact take place in chronic diseases, although appearances show the contrary.

Divesting our mind of all prejudice and prepossession, we discover, in the character of chronical disorders, the cause of the non-existence of the crises. Nature is, indeed, too weak and inactive in diseases of long date, for us to believe that, in the state of atony and weakness, she could concentrate the strength which she does not possess, and employ it against the cause which produces and maintains the chronical diseases. Observation, at least, proves the contrary: for, when these species of disorder are not opposed by the resources of art, either they become naturalized with the human body, and terminate in death, or they gradually destroy the vital powers, or become the parents of other serious and fatal affections.

And how is it possible that Nature, weakened, without energy, and deprived of vigour, can produce that general effort which is required in the phenomenon of crises, and of which she is scarcely capable in some acute disorders, where the vital powers are not in the end worn out, as in chronic diseases of long duration? The human body, which in protracted disorders or affections generally appears wasted, and exhausted of vital juices, cannot afford the least assistance to Nature, in order

that she may contend against diseases which do not irritate and shock her, as is more and more the case with the majority of chronic disorders. And if Nature did not afford some assistance at the commencement of chronical diseases, how could she still continue to do so for any length of time, when it is supposed that her resources are exhausted, as, in fact, they appear to be? Unless we are disposed to convert chronical into acute diseases, as has been attempted by different physicians, it is not otherwise possible to see the efforts of Nature in activity, or the crises in diseases of long duration. Now, this at present obsolete method of converting chronical into acute diseases, must inflame all the vital organs, especially when the chronical diseases are kept up by organic affections, because they must necessarily be irritated, exacerbated and aggravated, by a method which we believe to be empirical, if not altogether inflammatory. Hippocrates assures us that a chronical disease may last six months, two, and sometimes six years.* Now, if Nature be unable to produce the crisis at the commencement of a chronic disease, how

* See de Affect. intern. cap. lii.

is it possible for her to do so at the end of the sixth year ?

Finally, reverting to the first part of this examination, which concerns the doctrine of the crises, as delivered by Hippocrates ; we shall observe, on the other hand, that there are not wanting eminent physicians who declare, some publicly, and others tacitly, against the doctrine of the crises. The former, who reject, and in fact proscribe it altogether, from the dominion of medical practice, are guilty of pyrrhonism ; as are the latter, who observe a profound silence respecting it, of gross negligence. All the anticrisists hasten, on the contrary, openly to attack every acute disorder, by administering, at different times, various powerful aids of art. Their excessive activity leads them frequently into the error of overthrowing the order which Nature observes in the course of acute disorders ; and to oppose this, with the mistaken intention of arresting their regular course, must consequently be an empirical and erroneous method.

Such an excess of zeal and activity, by the patient's bed-side, is rather desirable, to a certain degree, in the treatment of inflammatory angina, and in the cure of the more severe inflammations of the breast and abdomen,

especially in cold climates; not only because these acute disorders proceed with great rapidity, and frequently terminate either in suppuration or gangrene, but also because they may degenerate with equal quickness into organic affections.

The disciples of the school of Van Helmont are the most inveterate anticrisists of all. After these may be reckoned Barbeyrac, Bouvart, Sinapius, Fizes, and various other eminent writers. Of what utility is it to await the event of crises, says Van Helmont, when the method of directly attacking the cause of the disease is well understood? While yet young, Van Helmont wrote five books upon critical days, and at a more mature age committed them to the flames. Celsus, whilst he commends Asclepiades for having set no value upon the doctrine of the crises, likewise makes the observation, as we have mentioned above, that the ancient physicians could only have drawn the system of critical days from the Pythagorean philosophy. We should also here remark, that Celsus gives himself credit for having followed the medical practice of Hippocrates, and for having judiciously rejected his hypothesis relative to the crises: Which suffices to show, that Celsus entertained a

different opinion respecting the doctrine of the crises. Barbeyrac disdains to mention the crises, because he looked upon them as emanating from the hypotheses of the old school. Sinapius also considers the opinions of the ancients upon the crises as of no importance, for he designates them as *nugæ*.

Sydenham, that learned and acute investigator, declared himself adverse to the ill-founded hypothesis of the ancients upon the crises; for, treating of pleurisy, he maintains, that all the morbid matter which should have been rejected by the crisis, may be dissipated at pleasure by bleeding. The following are his words: "*Mediante venæ sectione morbifica materia penes meum est arbitrium, et orificium a phlebotomo incisum tracheæ vices subire cogitur.*" Harris, therefore, passes a great eulogium upon Sydenham, because he purged his patients at all times of the fever.

Both Chirac and Fizes reject the doctrine of the crises. Chirac accuses both Hippocrates and Galen of empiricism, for having introduced and promoted it; although he contradicts himself in certain other passages relative to malignant autumnal fevers.* Fizes,

* See Chirac, *Traité des Fièv. malig. et aut.*

speaking also of fever, which he says directly opposes the vital principle, thus expresses himself: *Sic naturam errantem dirigimus, et collabentem sustinemus, non otiosi crisisum spectatores.* *

We will now compare the opinion of Fizes to that of the before-mentioned anonymous author of the *Specimen novi Medicinæ Conspectus*, who says: *Crisium typus dierumque criticorum, quorum ab Hippocrate traditus ordo, non tam facile quam plerique clamant clinici, venæ sectionibus et medicamentis patitur immutari seu accelerari.* In another passage the same author shows, that every febrile motion, because it tends to overcome the cause of the disease, must be considered as critical; or, as he says, tending to the production of the crises: *omnis motus febrilis, quia tendit ad superandum morbosum obicem, criticus censendus est, vel tendens ad crises.* †

Now what course are we to take in the midst of so many opposite opinions, which divide the medical world upon the doctrine of the crises and critical days? On the one hand we must avoid the error of following the practice of

* Fizes, Tract. de Febrib. † Ibid.

Hippocrates in its fullest extent, and on the other the pyrrhonism of those who reject and proscribe it altogether. Both these excesses are condemnable, and it is only in the just medium that we can find the rational method which should be adopted. We must renounce the practice of the spectatrix medicine of the ancients, when the vital powers appear to be, and are, profoundly depressed and weakened by the attacks of the diseases, as is observed in ataxic, adynamic, and malignant fevers, in which the most efficacious assistance of art is required. But this method does not, on the other hand, direct that we should destroy the efforts of Nature by dint of active remedies, when the pulse announces the approach or arrival of one or the other crisis. It may very well be the case, that Nature, after the administration of the first remedies, acquires sufficient energy and strength to produce, in the course or towards the end of such diseases, the necessary crisis; and the temerity would certainly be culpable, of opposing, in similar cases, her intentions; human knowledge being too circumscribed, when compared with that of Nature.

And in proportion as it is advantageous to humanity, and to the science of pathology, to

avoid the errors of the spectatrix medicine in diseases of extreme languor ; so it is equally useful and advantageous, in our opinion, to adopt the wise resolution of shunning, on the other hand, the sad and fatal effects of a tumultuous, active or violent practice, in all the other cases in which acute disorders observe a regular course ; a course which should be respected, as that which is natural to the character, essence or mode of being, of the different acute disorders : a contrary method can only exacerbate, provoke, and make them still worse. It is only when these become degenerated from some accident or untoward event, that it is expedient to combine the powers of reason with those of art, and to examine thoroughly the genius of the new disorder, for opposing a fresh resistance to it, either by a moderate or active method, as may be required ; being always seconded by prudence, which is justly the acknowledged emblem of the medical art.

Without, therefore, running, on the one hand, into the abuse of forcing observation to coincide with every fanciful system, or of erroneously submitting the laws of Nature to the attractions of the Pythagorean numbers, blindly adopting the doctrine of the crises and of the

critical days of Hippocrates, when it is requisite to oppose this or that acute disorder by the means prescribed by art; and without committing, on the other, the mistake of openly and immediately attacking all acute disorders indifferently, in conformity with the false system of the most inveterate anticrisists; we should follow with justice the prudent course pointed out by reason; that of ascertaining, by the assistance of the science of the pulse, when we may confide to Nature alone the favourable termination of a disease; when it is expedient to second her with slight and simple remedies; or else, when it is necessary to strengthen her powers by the strong and prompt assistance of art. Similar to this is, at least, the method indicated by the following investigation of critical pulses.

ART. I.

OF CRITICAL PULSES IN GENERAL.

IN order to acquire a correct idea of the critical pulses, the examination and description we have already given of them,* is not sufficient; we must, ere we proceed to describe the crises, investigate their mechanism, and the means employed by Nature in order to produce them; the more so, as it is in the examination of both: that is, of the mechanism of the crises, and of the means employed by Nature, that the origin of critical pulses is found.

It should first be observed, that Nature, before she destines one or more excretory organs to the reception of the morbose cause of certain acute disorders, excites and produces in the organic system a species of intestine commotion, or general tumult, and by

* Page 7.

this sensible and violent effort she endeavours to remove and expel the before-mentioned morbose cause from the minute receptacles, in order to give it up to the energy of organic actions. For this purpose, she excites, raises and elevates the sphere of activity of the heart, arteries, and veins, and consequently of the nerves which specially concur to their vitality. To the impetuous elevation of the sanguineous system necessarily succeeds the acceleration of the course of the blood, and the frequency of the inspirations and expirations; and by means of this mechanism of the increased and rapid course of the blood, Nature succeeds in overcoming the hindrances or obstacles which usually prevent the blood-vessels and the excretory organs from freely exercising their functions, and consequently in removing from the small receptacles the morbose cause, abandoning it, as we have said, to the exaltation, elevation or energy of the organic functions.

At the same time, the patient feels a general indisposition, the result of that tumult or agitation: at one time he complains of a painful sensation in the stomach, at another, of a great heat over the whole body, or in some region or cavity of it; the features of the face become

animated, and the eyes and cheeks tinged with red.

The pulse, which is generally small, hard, thin and concentrated at the commencement of acute disorders, changes its aspect and character at the moment of the intestine commotion, and becomes elevated, full, strong and developed; beats with celerity, and oftentimes with a certain rebounding, a rebounding which caused Hippocrates to say that the pulse is exacerbated at the moment of the crisis,* and which we derive from the rapid turns made by the columns of blood from the right to the left ventricle of the heart; or, which is the same, from the capillary system of the lungs to the general capillary system. In this manner Nature effects the first critical revolution in the system of the circulation of the blood, where, for the first time, the character or the nature of the morbose cause of certain acute disorders becomes partly changed, or where the humours of the crisis, which is the same thing, begin to receive, as will be seen, the first steps of preparation or concoction, according to the technical language of practitioners. Galen,

* See Hippocrat. de prænot. et coac.

without being acquainted with the mechanism of this effort of Nature, says, notwithstanding, that the pulse of the crisis is elevated and great (*altus et magnus.*)*

In the mean time, the blood-vessels, where Nature limits and confines, in the first place, the matter of the crises, in consequence of being irritated and disturbed, begin by an organic law to react, exercising their tonic movements, and with these the blood-vessels succeed in attenuating, modifying, and lastly, in rejecting, the matter of the crises in somewhat an altered state, depositing it, as they do, in the excretory organs.

That the action of the blood-vessels does actually participate in the preparation or concoction of the humours of the crises, is proved by the process of suppuration, which Nature effects in a similar manner with the exaltation of the arterial action of the affected or inflamed part. In support of this truth we have likewise the authority of Baillou and Fouquet, and of several other distinguished physicians of the last century. Baillou points out the influence of the arterial action upon

* See Gal. de crisib.

the matter of the crises, when he says that there is then a kind of abscess in the vascular system of the organs.* And Fouquet admits it openly, for he advances in his work above cited, that the matter of the crises begins to assume a purulent form in the blood-vessels; † and in like manner other classical writers.

It is likewise necessary to observe here, that so long as the matter of the crises remains in the system of the circulation of the blood, the pulse cannot indicate the kind of crisis which will succeed, nor the organ or organs by which the crisis will be produced. The most that can be done, is to deduce from the presence of the elevated, full, dilated, strong and quick pulse, the existence of the matter of a crisis in the system of the circulation of the blood, or that Nature is there preparing the commencement of a crisis ; but this, we repeat, does not enable us to predict its species nor its termination. What is certain is, that when the one or the other crisis is not preceded by the elevation, dilatation, and fulness, as well as by the quickness and rebounding of the

* See Baillou, *Epid. et Ephem.* t. i. lib. 2.

† Fouquet, *Essai sur le Pouls*, p. 83.

pulse, it is then a sign that both crises will have a doubtful and uncertain, if not unfavourable and fatal termination, for the simple reason that it is the elevation of the sphere of activity of the system of the circulation of the blood, upon which depends the commencement of the preparation or concoction of the matter of the crises; or that which impresses upon it the first degrees of its transformation; and in the event of this first effort of Nature failing, or not being sufficiently efficacious;—in this case, there results the inconvenience that the crisis will be incomplete, and therefore imperfect.

When Nature has once assayed in the crucible of the action of the sanguineous system, the matter of the crises, she directs it immediately either to one or the other excretory organ, or to one of them alternately, and by means of the capillary arteries which there deposit it: in its presence, the excretory organs become so many centres of tonic movements; fall into a certain orgasm; become agitated; make efforts; become erected; enlarge and contract themselves, and by this mode of action they succeed in perfecting the work of concoction, begun, as we have said, in the system of the circulation of the blood. Hence the character of the one or of the other critical pulse

manifests and pronounces itself, and its form, figure or expression varies, as we shall see, in proportion to the variations of the critical pulses, and consequently of the excretory organs, which are charged with the work of the crisis, or with the last concoction of the critical matter. It is then, that we can see by the light of the one or other critical pulse, which are the organs destined and chosen by Nature to receive, concoct, and expel the morbose cause, after it has been finally reduced to a substance wholly excrementitious; and it is then that we can predict the species of crisis which will take place, and determine, more or less, or by approximation, the time of its appearance, its favourable or unfavourable termination, and the quantity or copiousness of the critical matter which will follow, or be expelled.

So that, when the humours of a crisis have been so well concocted and changed by the tonic efforts of the excretory organs, Nature then puts in requisition their excretory conduits, and these latter, participating in the exaltation and agitation of the organs to which they belong, dilate, contract, straighten, and open themselves, in order to receive the excrementitious matter; they apply themselves to it after having received it,

contract, and thus expel and reject it out of the body, which is daily seen in the course, or at the end of certain acute disorders, which are judged by a crisis. After the appearance of the critical excretion, all the organic functions gradually return to their former state of tranquillity, harmony and equilibrium, in proportion as the expulsion of the critical matter by the excretory organs is effected; and its total egestion is announced by the change of the critical pulse into the natural one, and by the period of convalescence which succeeds to that of disease. Such at least is the result of practical observation.

From what we have hitherto shown, it will clearly appear that both the critical revolutions; that is, the one which is produced by the system of the circulation of the blood, and the other, which takes place in the excretory organs, do not appear to differ from two efforts, endeavours or violent expressions of the organic system, which are distinctly pronounced by the reaction of life, which, as is known, resists whatever induces upon it uneasiness or harm; and its reaction precisely manifests itself under the aspect of the exaltation of the organic functions in the presence of the morbose and noxious causes.

The ancient opinion, therefore, that Nature is an agent different from the phenomenon of life, from its reaction, and from the complexity of the organic laws which regulate its exercise and continuance, falls to the ground by its own weight. Therefore, Synesius and Plotinus were bold enough to give to Nature the epithet of magician or witch.*

The other circumstance respecting critical pulses not less useful to consider, is that of seeking for and finding the cause which makes them at one time elevated, dilated and developed, and at another, small, thin and concentrated. This knowledge is the more important, because it conducts us to the object of distinguishing the superior critical pulses from the inferior ones, or these latter from the former, and decides, as we shall see, upon the merit of the treatment of acute disorders.

As soon as the matter of a crisis is transported from the capillary arteries into the excretory organs, two sensible changes may be observed in the pulse; changes which were equally striking to Galen, Aëtius, and several other

* Vide *Gelée*, translation of *Dulaurens*.

physicians, even of the last century.* The pulse, we may affirm, can elevate, dilate and develope itself, as we have mentioned above, and can also contract, lessen, conceal itself and become deep-seated. It elevates, dilates, enlarges and developes itself when Nature, by her movements, directs the matter of the crisis to the surface of the body, or to the superior organs; and on the contrary, it lessens, contracts, and concentrates itself, as often as Nature throws and confines it to the inferior organs. In the former case, we remark, as we shall see, the critical sweat, the nasal hemorrhage, the egestion of the mucous and purulent matter of the tonsils, or the expectoration; and in the latter, the vomiting, diarrhoea, urinary fluxes, the bloody flux of the intestinal rectum, or even that of the matrix.

Without closely adhering to the old maxim, *ubi stimulus ibi affluxus*, or to the dilatation or developement of the diameter of the arteries, which results, in consequence, from the concourse of the humours, we shall observe that the more external arteries, such as the radial, temporal, carotid, &c., cannot but manifest themselves sensible to the tu-

* Borden, Fouquet, Michel, and many others.

mult and agitation in which the superior organs are at the moment of the crisis, and that both the superior organs and the arterial vessels belonging to them, must there develope all their strength and activity, when Nature there concentrates her movements, her vital powers, and the presence of the matter of the crisis which concurs in them : in consequence of this, all the arteries most external and near to the superior organs, then the centre of the vital motions, must manifest their state of activity, which they in fact do whilst they beat with a quick and rebounding motion, and whilst their beatings or rhythmical, are dilated, elevated, full and developed.

An effect contrary to the first should be, and is in fact, observed in the pulse, when the seat of the crisis is in the inferior organs, whither Nature directs, at that time, the strength and movements, and the matter of the crisis ; because the pulse which follows their direction cannot but lessen and contract itself, as happens precisely in all crises, which are operated by the inferior organs. And is not, in fact, the concentration of the vital powers in the interior of the body, or in the inferior organs, the sole cause of the contraction of the

cutaneous vessels, and of the more external arteries, and therefore of the shiverings or cold fits which seize the patient in the febrile paroxysm?

And so general is the principle that the pulse always follows the direction of the vital powers,—that not a single moment of life passes without the effects of a similar phenomenon upon various individuals of the human race being seen or felt. Whether a person quicken his steps, runs, or performs any active exercise; whether he immerses himself in a warm bath:—in these and other similar cases the vital powers develope, discover, and show themselves at the surface of the body, or in the superior organs, and the pulse is in proportion dilated, elevated, developed, and quick; and on the contrary small, thin, deep-seated and concentrated when the vital powers are drawn to the interior of the body, or to the inferior organs from its surface, or from its superior parts, as is the case at the sight of an object which strikes terror, fear or alarm, or by the effect of any other moral or physical cause whatsoever.

A perfect image of the organic law, which makes the pulse follow the concentration of the vital motions, at one time from the

superior to the inferior organs, and at another from the latter to the former, is exactly depicted in the course of the action of the known remedies of art. Thus, for instance, when a purge is administered or caused to be administered to an individual whether in want of it or not; at the moment that the purge begins to act upon the vitality of the stomach and intestinal tube, which is the continuation of it; it there attracts at the same moment from all the other parts of the body the vital powers, and establishes there a concourse of humours. On the appearance of the humours the intestinal tube commences its action, and reacts with much energy; erects and enlarges itself for a moment, contracts and becomes straight; its mucous glands participate in its motions, and the capillary arteries deposit there fresh humours. Then the whole intestinal apparatus reunites and concentrates its powers; directs them against the causes which disturb and irritate it; and by dint of new and reiterated efforts, the intestinal tube at length succeeds in ejecting them from its cavity.

But that which is most important to remark is, that whilst the intestinal tube becomes by this means a centre of actions, motions, vital powers and humours; the countenance grows

pale; the external covering of the body contracts itself; the superior organs languish; the contractions of the heart, and of the arteries belonging to the superior organs, grow weak, and slacken their motion; and the pulse which always follows the concentration of the vital powers, which in such a case is supposed to be in the inferior organs, cannot but show itself small, thin, concentrated and deep-seated; such as is, in fact, observed in the course of the action of purges, and on the approach and in the period of the critical evacuations of the belly, according to the result of practical observation.

If, instead of a purge, a diaphoretic or an expectorant be administered, an effect quite contrary to the former is the result: that is to say, the enfeebling of the inferior organs, followed by the inactivity of the belly; whilst either the cutaneous system, or the areous organ, exercises its functions with so much energy and force, that a sweat or expectoration is not long in making its appearance, and the pulse is proportionably dilated, elevated, strong and full. Such is the organic law, which makes the state of the pulse depend upon the concentration of the vital powers, upon the direction of the efforts of Nature,

and upon the concurrence or accumulation of the humours which follow them.

And what practitioner is not aware, in the present day, of the efficacy of blisters and sinapisms, which draw the irritation and the spasm, if not the gouty humour and the exaltation of the vital powers, from the internal to the external parts of the body, in the paroxysm of the gout, when this disease attacks the stomach or any other inferior organ?

After all, we find in the concentration of the efforts of Nature, and of the vital or tonic movements of the excretory organs, where that tumult takes place which Nature purposely excites in the presence of the matter of the crisis ; in the assemblage, we say, of these phenomena, we find the cause of the critical pulses, the variety of which arises, as every one may suppose, from the various excretory organs which Nature is accustomed to choose and destine to the reception of the matter of crises, somewhat modified by the system of the circulation of the blood ; and the various critical pulses express to the organ of touch the state of exaltation and orgasm of the various organs which produce the crises, in like manner as colours, sounds, smells and food, express to

the other sensory organs the character or nature of the objects which act there, and are the cause of the various sensations, the origin of human knowledge.

The other subject to be treated of, as connected with critical pulses considered in a general manner, is to remark that these do not differ from the organic pulses, as far as respects the form, figure or physiognomy with which they manifest themselves to the sense of touch. In addition to our having an opportunity of convincing ourselves of this truth, in the practical description of critical pulses, we deduce it also from the orgasm or agitation in which the excretory organs are, as we have said, at the moment of the production of the crises. In fact, whether the one or the other excretory organ is excited, disturbed or irritated, by the stimulus of the critical matter, or by the action of a local affection;—in both cases, the organ is always affected or indisposed; and although its affection may be momentary, because produced by Nature in the former case, and of longer duration in the second, by the presence of a local disorder; Nature, however, does not employ a different language to make herself understood, or a different phraseology to express by means

of the pulse, the state of the organ affected, either by the presence of the matter of the crises, or by the action of a local disease. In other respects, it is not necessary that Nature should multiply her modes of expression unnecessarily.

In the first place, it must be observed, that the critical pulses do not proceed from diseases; they arise, as before said, in the progress, or at the end of certain acute disorders, from the efforts made by the organs themselves, in order completely to concoct the matter of the crises, and to expel it immediately: whilst the organic pulses constantly arise from local affections, which they announce at the moment that these develop themselves; nor do the organic pulses cease to exist before the local affections terminate. Now, if these circumstances are sufficient for distinguishing the critical pulses from the organic ones, what other motive could induce Nature to complicate her phraseology?

But, if it were necessary for Nature to multiply her expressions, when treating of the state of agitation, affection or irritation of an organ, disturbed by the stimulus of the matter of a crisis, or by the action of a local disease, for the effect is, in fact, the same; she has not,

on that account, neglected so to modify the energy of her expressions in order to distinguish also by this means critical pulses from organic ones, although, to discover them to the senses of the learned practitioner, she makes use of the same language. In a word, Nature expresses herself with greater force and energy in acute disorders, where the critical pulses supply the place of her expressions, in order to show the great danger with which life is then threatened. This is not the case with local affections, in which Nature does not show herself so much alarmed, nor equally active : hence it happens, that the organic pulses, by which Nature expresses the existence of local affections, have not generally that strength and energy of character, which, for the above reasons, the critical pulses possess, although the figure, form or physiognomy of the various characters of the one resembles that of the various characters of the others.

Therefore, whether the local affections commence and proceed slowly, as they generally do; whether they consist in so many partial, false, asthenic or spurious inflammations; whether they attack certain organs or viscera with obtuse sensibility; in all these cases the local affections do not possess sufficient physical strength to

effect a decided alteration in the functions of the organs affected, nor to elevate the system of the general circulation in such a manner as equally to pronounce the character of the organic pulses: the cause, therefore, in which originates the declaration of the character of one and the other kind of pulses not being so energetic in local as in general diseases, we find in the feebleness of the expression of organic pulses another luminous means, by which we may distinguish them from the critical ones. It is rather in phlegmasies, or local hypersthenic inflammations of the organs endowed with acute and exquisite sensibility, it is rather in these local affections that the mechanical character of the organic pulses is usually more elevated and pronounced; but it does not on this account become so elevated and pronounced as for its elevation to be confounded with that of the critical pulses, to the developement, expression or elevation of which concur at one and the same time the combined powers of Nature, the exaltation of the functions of the excretory organs, the concentration of the nervous action, and the presence of the matter of the crisis.

The office of the critical pulses is to announce the approach of the crises; these, for

reasons we shall explain, may be simple, compounded or complicated. The simple critical pulses precede the arrival of a crisis which is produced by a sole excretory organ ; the compounded occur when two or more simple pulses meet together, or alternate with each other by turns ; these predict the crisis, which is effected by two or more excretory organs at the same time, or alternately, and the last, which are the complicated pulses, whilst they result from two or more simple pulses, like the compound, are never unaccompanied by a certain degree of irritation, which is always, as we shall see, of sinister augury.

Cæteris paribus, the presence of one critical pulse alone, causes us to form a favourable opinion of the event of the crisis, and of the termination of the disease. The crisis which is produced by one organ alone, shows the simplicity and slighness of the disease, and is generally complete, salutary and favourable. The presence of more critical pulses than one, gives reason to fear the event of the crises and the termination of the disorder, whether they meet together at the same time, or whether they alternate by turns. Their presence may arise from the less docile and malignant character of the disorder, and may be the effect of

the uncertainty, embarrassment or weakness of the powers of Nature; hence, there are reasonable grounds for fearing the termination of the disorder, unless it appear clear from the proceeding of Nature, that her object in employing more excretory organs for the concoction and expulsion of the matter of the crisis, does not arise, either from uncertainty or embarrassment, or from want of resources, but from the character of the morbose cause, which requires to be subjected alternately to different excretory organs, in order successively to acquire the new character of an excrementitious substance. The rule which should always be followed in these, and other difficult cases, is that of establishing every prediction upon the state and condition of the vital powers.

The certainty of the danger which threatens life in acute diseases, is rather deduced from the presence of complicated critical pulses, which are never unaccompanied by the pulse of irritation. The irritation of the pulse results, in this case, from the crudity of critical humours, and from the state of fatigue and weariness of the excretory organs, which, on account of not being able to reduce the tenacity of the critical matter, after so many

reiterated efforts, refuse, so to speak, the invitations of Nature ; and express their refusal and disobedience by their harsh re-action, which always contributes to render harder and more concentrated the pulse in the crises, on that account imperfect and false, which are accustomed to take place in the inferior organs : hence, the crises become either sterile or useless, or are most often fatal, unless the pulse of irritation be transient, or resists only for a short time. As long as this pulse exists, it is not to be hoped, that the concoction is effected in the excretory organs, by reason always of the irritation which directly opposes itself to the progress of the crises, when it does not stifle and suppress them, as is the most common effect. In its proper place we shall see how dangerous the pulse of irritation is in the course, and towards the end of acute disorders.

Lastly, all the critical pulses differ from each other, because all refer to the various organs which produce the crises ; they may, however, be comprised in two sections : to the first belong the superior, and to the second, the inferior critical pulses. The former show the agitation or embarrassment caused by the presence of the matter of the crises in the

superior organs, and the latter announce the same phenomena in the inferior ones. In the first section are comprised, 1°. The critical nasal pulse ; 2°. The guttural ; 3°. The pectoral critical pulse : and in the second section, 1°. The critical stomachal pulse ; 2°. The intestinal ; 3°. The hemorrhoidal ; 4°. The uterine : 5°. The hepatic ; 6°. The urinary ; and, lastly, the critical cutaneous pulse, which may be considered as a supplement to this section.

SECTION I.

OF THE SUPERIOR CRITICAL PULSES.

THE first superior critical pulse to be examined would be the capital, did this exist: the fact is, that the vessels and emunctories of the nose are the ordinary outlet for the excretions of the head; hence there does exist in Nature the organic pulse of the head, but not the critical one, in consequence of the critical excretions being performed by the organ of the nostrils. Besides, the long continuance of the matter of the crisis in the brain, would not fail injuring, by its pressure, the delicacy of that organ; neither also is its structure formed upon the model of the excretory organs, in which the phenomenon of the crises actually takes place. The critical nasal pulse is, therefore, that which first presents itself to our examination.

ART. II

OF THE CRITICAL NASAL PULSE.

UNDER this name is precisely meant the pulse which precedes the critical excretions of the nose; we say excretions, because they are of two kinds: the one is sanguineous; and the other, mucous, pituitous or purulent. In both these excretions the nasal pulse constantly discovers itself, and determines its kind when complete abstraction is not made of the character of the disease, which is closely allied with the variations produced upon the nasal pulse by the action of the different critical matters.—Thus, in the same instant in which Nature concentrates the matter of the crisis in the sanguineous vessels and emunctories of the nose, the nasal critical pulse is observed; and this latter, whilst it is produced by the irritation or orgasm excited in the nostrils by the humours of the crisis, never fails, as we shall see, to announce and determine by its variations the kind of excretion which will there take place.

The nasal critical pulse has existed, and still does exist, under various names. The physicians of antiquity called it *bounding-goat*: of this number are Herophilus and Galen, with their followers; whilst others, as Solano, call it *dicrotus*; Nihell, the pulse which *rebounds*; and Fouquet, the double pulse. Whatever may be the merit of these apparently different appellations, it is certain that they all comprise the same meaning; for whether the rhythm of the nasal critical pulse resemble the unequal motions which are observed in the leaping of a goat, or that its diastole is acted upon by two efforts, the one after the other; whether it rebounds, or that immediately after one stroke, it gives a counterstroke, or its pulsations, according to Fouquet, are double; the effect is, however, always the same; since, in whatever manner the thing is considered, it is always reduced to a pulse, whose diastoles are each divided into two twin pulsations, which succeed each other with such rapidity, as not to afford either the touch or the mind sufficient time to distinguish the least interval of rest between the one and the other; the only difference to be observed is, that the second stroke or beating is operated with greater energy and quickness than the first.

The point of the question is not to discuss whether the above-mentioned denominations have or not the same signification ; but to see at present if the *bounding-goat*, *dicrotus*, *double* or *rebounding* pulse is, in fact, such as it ought to be, in order to announce the critical excretions of the nose, as authors pretend. We will remark to the followers of Herophilus, Galen, Solano, Nihell, and of various other eminent writers, that the dicrotism, the bounding, reduplication, or any other similar motion of the beatings of the nasal pulse does not constitute its intrinsic character, as the critical excretions of the nose can often take place, as we shall see, without the pulse which precedes them being *bounding-goat*, *dicrotus*, *double* or *rebounding* ; and when a kind of dicrotism, or any other similar motion in any of its diastoles does take place, it is so obscure and slight in certain cases, that it is scarcely sensible to the touch, as is found in some catarrhal fevers. At most, the dicrotism or redoubling of the diastoles can form a part of the secondary qualities of the critical nasal pulse ; and as a secondary characteristic, it should no longer exclusively guide the practitioner in the prediction of the critical excretions of the organ of smelling.

It is rather the organic character, or mechanism of the nasal pulse, which should be consulted in similar cases, without the practitioner confining himself, as is the general practice, to search solely for the dicrotism or redoubling, which may not exist, though the critical excretion takes place. It is true, the union of one and of the other; of the mechanical character and of the dicrotism, certainly corroborates the prognostic concerning the event of the crisis; but this does not prevent its often occurring, when even the dicrotism or redoubling is wanting in the rhythm of the critical nasal pulse.

The mechanical character of the critical nasal pulse does not differ, as above said, as far as regards its form, from the mechanical character of the nasal organic pulse; their difference consists only in the degree of energy or of expression which distinguishes one from the other; for, *cæteris paribus*, the one is more energetic and expressive than the other.

It is in the following mode of existence of the pulsatile artery that properly consists the mechanical, organic, essential or radical character of the critical nasal pulse. The anterior part of the artery, which is likewise called digital, is, as we have said in the investiga-

tion of the nasal organic pulse, flat, like a small riband drawn tight, rigid, and possessed of some resistance ; and to this flattening of the artery exactly corresponds the point of the index finger : it is worth observing, that whilst the anterior part of the pulsatile artery is seen to be flat, like a riband, its posterior part, which is also called brachial, is found as if swollen, so much is it enlarged. The other peculiarity to be observed in the examination of the artery, is the existence of certain small round bodies, like so many drops of water, which, according to the sensation that is felt in the digital part of the artery, under the point of the index finger, run through and succeed each other : when the small bodies are joined to the apophysis of the radius, it appears that they strike against it, and are beaten and driven back ; then these, as if they opposed themselves to those which followed them, produce, from their conflict with the latter, a collection of still smaller corpuscles, which give to the digital part of the artery in which this phenomenon takes place, an appearance of roughness or rigidity. At other times the whole mechanical character of the nasal pulse reduces itself, as we have observed, when speaking of the or-

ganic nasal pulse, to a kind of granulous formation, which is felt instead of the small round corpuscles. The energy and mechanical character of the critical nasal pulse varies according to the sex, age and temperament, and in proportion to the character of the acute diseases, and of the various climates under which the different subjects live. Such an organic character of the nasal pulse is much more expressive in warm, and gradually less in temperate and cold climates.

The secondary qualities with which the before-mentioned mechanical character of the critical nasal pulse is generally accompanied, are the elevation, rigidity, and tension of its rhythmical or beatings. These qualities result from the genius of the superior pulses to which the nasal one belongs, and the cause of which must be attributed to the vicinity of the superior organs to the heart, according to the observations which we have advanced in the treatise upon organic pulses. Into the order of these secondary or auxiliary qualities of the nasal pulse, enters also the rebounding of its diastoles, according to Herophilus and Galen; the diastole of Solano; the rebounding of Nihell, and the redoubling of other more modern physicians. All these

irregular motions of the pulse may, in fact, be observed upon the approach of the critical excretions of the nose, when one obstacle or another prevents the blood from freely performing its course in the arterial and venous system; the more so, as at the moment of the crises, the organic functions are in agitation, or excitement; and in this state of disorder it would not be difficult to observe the one or the other effect of the irregularity of the course of the blood.

This opinion arises from the observation, that the dicrotism or redoubling of the diastoles becomes weak, languid, and altogether obscure, if not null, in certain critical excretions of white purulent humours; whilst the mechanical or organic character of the critical nasal pulse is there kept up, so long as the said excretions last. Thus it may be remarked, that the dicrotism of the pulse is very frequently observed in other kinds of hemorrhage, which caused Lancisi to say that the dicrotus pulse announces the existence of the menstrual discharge, and, more frequently still, the presence of an aneurism. We have observed the dicrotus pulse in several individuals affected with apoplexy, a disease in which it is supposed that the blood does not

circulate freely from the brain to the heart, and from the blood's pressing upon the mass of the former organ arises apoplexy: these observations strengthen still more the opinion we have lately advanced; that the dirotism is an effect of the irregular and difficult course of the blood, rather than the distinctive character of the nasal critical pulse.

To predict, however, the arrival of the nasal hemorrhage, it is not sufficient to ascertain the presence of the mechanical character of the critical nasal pulse, admitting that this may be well pronounced and very expressive, and accompanied by all the train of its secondary qualities: in order that the hemorrhage may be produced, and take place there, it is necessary that the organ of smell, and through it, the different blood-vessels belonging to it, should be disposed conformably to the mechanism of the hemorrhage: the tunics of the capillary arteries which are there distributed, should not strongly resist the shock of the blood, there attracted and concentrated by the efforts of nature; the freshness of age, the favourable condition of the sanguineous temperament, and the warm climates, must likewise concur: all these circumstances have the power of encouraging, retarding, or

even of entirely preventing the developement and arrival of the dropping of blood from the nostrils, as is too often seen to be the case in practice, by means of the callosity and hardness of the small arterial tunics which oppose it. This obstacle is very sensible in old persons, and even in adults, when these, by the constant use of snuff, or by the application of other odorous and irritating stimuli to the Schneider's membrane, have in this manner contributed to render obtuse the sensibility of the organ of smell, and inert and slow the action of the blood-vessels which are there disposed and distributed in prodigious number.

But when all the above-mentioned circumstances concur favourably, the arrival and approach of the nasal hemorrhage is presumed from the degree of expression of the mechanical character of the critical nasal pulse, from the number of double diastoles (when this happens to be the case) and from the degree of rigidity, hardness and tension of its rhythmi or beatings. The more the strength or degree of intensity of these attributes of the critical nasal pulse increases, the nearer is the arrival of the nasal hemorrhage; still more so, when to this is added, a difficulty of breathing, a flushed

and animated colour over the face, hardness of hearing, tingling in the ears, tears, and itching of the nose.

As to the quantity of blood which can make itself a passage through the small nasal arteries in the course of the hemorrhage, it is to be estimated, according to Fleming, by the rebounding, more or less frequent, of the artery, and also from the greater or less force of the second, twin or counterstroke pulsation: the more this is superior to the first pulsation in vivacity, quickness and strength, the more copious we may expect the flow of blood from the nostrils.

In this place, the question may be asked, is the nasal hemorrhage critical or not? It was thought to be so by Hippocrates, Galen, and their followers, and such still continues to be the opinion of a great number of practitioners. In stating the result at which he has arrived by means of his observations upon a subject more intimately connected, than is generally thought, with the state of practical medicine, the author throws himself upon the candour of those eminent physicians so well qualified to decide upon the merit, whatever it be, of the doubts which he entertains upon the critical character of the dropping of blood from the nostrils; it being his opinion, that

under whatever view the nasal hemorrhage is considered, it either is not critical, or is deceptive, when it arrogates to itself the appearance of a critical excretion.

It is a matter of fact that the nasal hemorrhage is produced more frequently at the commencement of certain acute disorders, and seldom towards the end; which does not appear conformable with the model of Nature, or with the order in which the true crises proceed; that the pulse which precedes or announces it, is never unaccompanied by a certain degree of irritation, which opposes itself, as we have said, to the work of concoction; that the effects of the nasal hemorrhage do not correspond in their full extent to the results of the true crises in short, every thing concurs in making known to us that the nasal hemorrhage is one of the symptoms of certain acute diseases arising from plethora, or solely the effect of an excessive fulness of the blood-vessels of the superior organs, and not, as authors believe, the product of a true and perfect crisis. Nor can it be otherwise, when the nasal hemorrhage does not result from a perfect concoction, which precedes the true crises. It is therefore a forced, or, which is the same thing, a symptomatic excretion.

The origin of the old opinion, that the nasal hemorrhage is critical, may be referred to two observations; first, to its not rare appearance in certain acute diseases, and secondly, to the improvement, although momentary, of the patient. As to the first observation, that of seeing not seldom the nasal hemorrhage in certain acute disorders, we can assert that it is in ardent or inflammatory fevers of the first class, that it is generally produced, as also appears from the cases mentioned by Hippocrates, Galen, and other eminent writers: hence it is no longer doubtful, that the nasal hemorrhage proceeds from the state of plethora, or from the overfulness of the blood-vessels; since it is plethora which concurs to the apparent character of inflammatory fevers. This is the reason why the nasal hemorrhage is more frequently produced at the commencement of ardent fevers, when the diathesis and the vital powers are supposed greatly to exceed the limits of moderation; a circumstance which no longer attends the patient at the close of the above-named diseases, when the diathesis and the vital powers visibly decline with the diseases themselves. Thus, when repeated bleedings are not neglected in such disorders, the nasal

hemorrhage scarcely ever occurs in them, or merely shows itself, and under this aspect it does not appear different from a natural bleeding, such as we consider it.

The other observation, which in our opinion induces practitioners to consider the nasal hemorrhage as the effect of a true crisis, is that of having witnessed the improvement, although momentary, of the patient; without reflecting that it was natural the improvement of the patient should result from the diminution of the inflammatory diathesis; a diminution which would have been equally produced by artificial bleeding, had that been resorted to in proper time. The nasal hemorrhage, removing, as does bleeding, the superfluous part of the sanguineous mass which forms the material cause of the inflammatory fevers, cannot but diminish their force, and in this manner relax the too-straightened chord of excitement, from which results that momentary improvement which, of course, the patient experiences.

It will not therefore appear so very strange an idea to consider the nasal hemorrhage as bleeding, originating from a state of plethora, or excessive fulness of the blood-vessels, and which does not otherwise avail to the indivi-

duals affected with inflammatory fevers. Besides, the author's opinion could not but be inconsistent; viz., that the nasal hemorrhage can be critical, while it is not produced by the excretory organs, where the matter of the crises, properly so called, acquires the true character of critical or excrementitious substance. Again, what reason or motive could Nature have in operating a real crisis, where it is only necessary to lessen the mass of blood, as is required to be done in certain inflammatory fevers? the more so, as the bleeding performed by the operator often anticipates the want of nasal hemorrhage.

The account given by Hippocrates of the perfect cure of the daughter of Larissea on the sixth day of an ardent fever, in consequence of a copious discharge of blood from the nostrils, proves rather that the nasal hemorrhage, by removing all the excess of blood which was visibly the cause of it, removed, in fact, the presence of the disease: *sublata causa, tollitur effectus*: nor, because Larissea's fever was overcome by the dropping of blood from the nostrils, can it be inferred that the effect of this hemorrhage corresponds to the result of the real crises, since the latter take place in the excretory organs, chosen and destined by

Nature for this kind of operation; and the former is produced by the small nasal arteries, in which the critical matter cannot become altogether excrementitious. And it appears likely, that had Hippocrates seasonably performed one or more bleedings in this case, he would have prevented the appearance of the nasal hemorrhage on the sixth day.

Hippocrates makes many other observations, in which he says, that all persons who had been attacked by acute fevers, followed by a bleeding at the nose, were cured without exception. We agree with Hippocrates in the fact, that the nasal hemorrhage always happens opportunely and advantageously in acute hypersthenic or inflammatory fevers; but it is not to be thence inferred that the hemorrhage is critical, as long as it remains unproved that one or more bleedings, as needful, do not produce, in similar cases, the same effect: the proofs which are deduced from the observations of Hippocrates, in favour of the critical character of the nasal hemorrhage, can never have the least weight; besides, we daily see, especially in warm climates, persons attacked with fevers die in great number, in consequence of the nasal hemorrhage.

But even were we to be inclined to admit

Bordeu's opinion, that the nasal hemorrhage is an imperfect crisis, we should always find in its imperfection a reason for believing it inadequate to the regular and favourable termination of acute disorders, in which the whole humoral mass is concerned, for the reason that these latter cannot terminate regularly and favourably, when the matter of the crises does not first pass into the crucible of the excretory organs; thus it is useless to expect the arrival of the nasal hemorrhage, and to trust the favourable termination of acute humoral diseases to the effect of this supposed or imperfect crisis. It is true, we should not prevent the developement or arrival of the nasal hemorrhage in ardent fevers, and in other acute disorders arising from excessive robustness, because the taking away of blood, whether effected by Nature, or by artificial means, enters completely into the plan of cure, and they both arrive seasonably. This, however, would not prevent a great error from being committed in practice, if, in fruitless expectation of the nasal hemorrhage, artificial bleeding was neglected, when the case actually required it.

But, however important it is not to hinder, but on the contrary to second, according to cir-

cumstances, the appearance of the nasal hemorrhage in fevers and other diseases arising from superabundant strength; we ought to avoid, as in the highest degree dangerous, the erroneous maxim of not preventing its arrival, or of not arresting its course in ataxic, pituitous, or mucous and malignant fevers, in which every kind of abstraction of blood would certainly extinguish the remainder of the vital powers, and consequently the life which results from and depends upon them; the more, as the nasal hemorrhage, whilst it arises in ardent or inflammatory fevers from an excessive fulness of the blood-vessels, or from excess of strength, is derived, on the contrary, in malignant fevers, from the *depression* of the solids, the relaxing of the arterial tunics, and also from the enfeebled state of the vital powers, and from the dissolution of the blood which facilitates and promotes its course.

Whoever, therefore, thoroughly examines the phenomenon of the nasal hemorrhage, cannot but discover the old error, that the excretion of the blood of the nostrils is symptomatic and not critical; and the pulse which precedes and announces it concurs in proving it, from its being always united to and combined with the pulse of irritation. Upon this

subject, Bordeu thus expresses himself: " Il est bon de remarquer d'avance que quoique le pouls nasal soit appelé simple, il est néanmoins toujours compliqué avec le pouls d'irritation." * It is only the egestion of white, pituitous or purulent humours; it is only this excretion which can be called, and which is critical, as will be seen in the following practical observations, and this opinion results from the work of the concoction, which always precedes their excretion or egestion. Thus, all proofs concur in corroborating, with still more certainty, the maxim advanced by us in the preliminary discourse, that by dint of reducing isolated observations into principles, we obtain the great advantage of reforming them according to experiment and reasoning, and of throwing more light upon the horizon of practical medicine.

PRACTICAL OBSERVATIONS.

A countryman belonging to the province of Bari, in the kingdom of Naples, about twenty-eight years of age, and of a strong con-

* Op. cit. p. 275 and 276.

stitution, was attacked by an inflammatory fever, accompanied by corresponding symptoms, amongst which was a severe and almost intolerable pain, which the patient felt in the region of the temples. A considerable quantity of blood was taken from the arm, and six hours afterwards twelve leeches were applied to the temples. The pulse, notwithstanding this, continued more or less strong, quick, rigid and full, till the fifth day of the disease, towards the evening of which, it developed its organic character; a kind of granulous formication was felt in the digital part of the artery, and some of its diastoles were from time to time redoubled; the nasal hemorrhage arrived on the sixth day, and the blood from the nostrils continued flowing for several hours. On the eighth day, the patient experienced a great warmth and heat over his whole body, and the pain in the temples again returned. A constant use of nitrate of potash, administered from time to time in temperate water, promoted a profuse and universal sweat, and it was this critical excretion which entirely overcame the disorder; the patient was perfectly cured on the eleventh day. The result of this case sufficiently shows what value should be

set upon the nasal hemorrhage, and upon bleeding, when in inflammatory fevers there is combined with the plethora another physical cause which contributes to it, as happened in this case, which derived the fever from the suppression of perspiration.

A Neapolitan lady, thirty-eight years of age, of a plethoric habit, was occasionally subjected to a species of erysipelas, or phlogosis, which covered the neck and face, accompanied by a fever and burning heat upon the skin: on the third day of the disorder the pulse became nasal, on the fourth the hemorrhage came on, and on the fifth the patient returned to a state of health. On one occasion, the nasal pulse showed itself as usual, and did not sufficiently maintain; the nasal hemorrhage in consequence did not take place, and the disorder continued. It was then that eight leeches were applied to the anus, and the patient recovered her former state of health. From that time, on the first commencement, she always had recourse to the leeches, and the discharge of blood from the nostrils was never more seen to appear. Hence, it is clear from this observation, that the nasal hemorrhage can be and is of use in acute disorders of a phlogistic or hypersthenic nature, but it does

not on that account become critical ; nor was the nasal hemorrhage critical either in the first or in the second case, it being in the former the critical sweat which put an end to the inflammatory fever, and in the latter its place was supplied with equal success by the application of leeches to the nasal hemorrhage. To these instances we might add many others of continued fevers in which the nasal hemorrhage has been followed some days afterwards by the excretion, truly critical, of certain humours as purulent, and this excretion, and not the above-mentioned hemorrhage, has effected a happy and regular termination to the disorder.

ART. III.

OF THE GUTTURAL CRITICAL PULSE.

THIS is the pulse which announces the critical excretions which are operated by the glands of the throat, whence it has taken the epithet guttural. The guttural pulse is rarely found single; it either joins and alternates with the nasal and pectoral pulse, or is found combined with the pulse of irritation; a combination which frequently occurs in practice, and this caused Zecchius to say that the guttural pulse is elevated and wavy, and that it participates of the tension and hardness of the convulsive pulse. It is only in certain malignant fevers, so judged from the excretions of copious mucous, pituitous or purulent humours, which usually come from the glands of the throat; it is only in these cases, that we have observed the critical guttural pulse, isolated from that of irritation.

There are two reasons why it is difficult to

familiarize ourselves with the knowledge of the critical guttural pulse, before regularly studying the character of the other superior pulses; first, because in the quality of superior pulse, it participates of the elevation, rigidity and tension, things or qualities which belong to the genius of the superior pulses; secondly, because arising, as the guttural pulse does, from the agitation of the glands of the throat, which is placed between the breast and the organ of smell, the guttural pulse must of necessity resemble one or the other of the superior pulses, that is, either the nasal or the pectoral. By this means, it becomes an intermediate pulse, if not compounded of both: at one time it alternates and combines with the nasal, or with the pectoral pulse, and at another with both simultaneously; so that a perfect knowledge of it is to be acquired by means of their reciprocal comparison. Galen also saw, that the guttural pulse possesses some qualities of the pulse of consumptive persons, that is, of the pectoral pulse. Thus, the guttural pulse participates, as we have said, of the tension and rigidity, which are the attributes of the superior pulses; it resembles the nasal pulse as far as regards the redoubling of the greater part of its diastoles, and also the pecto-

ral, by reason of the developement of its pulsations. But although all these pulses are enclosed within a circle of relations and analogies, each of them has nevertheless an individual and distinct character: thus, by attending to their common qualities, it will easily be seen that these also vary in the superior pulses, where they indeed manifest themselves, differently and variously modified. Thus, for instance, however elevated the guttural pulse may be, its elevation never attains the eminent degree which distinguishes the pectoral pulse, where its elevation assumes the form or figure of a bow, or small protuberance, so great is the elevation of the pectoral pulse in the central or middle part of the pulsatile artery in all its diastoles; and the rigidity, strength and tension of the guttural pulse, where these qualities are found sensibly deteriorated, are greatly inferior to those of the nasal pulse.

And even should these traits of difference be not sufficiently clear and luminous, in order to distinguish the guttural pulse from the pectoral and nasal ones, we may always ensure perfect success by taking as our guide the presence of their various organic characters. In the critical guttural pulse there occur neither the flatness of the digital part of the

artery where the small round corpuscles run, or where is felt the impression of a certain granulous formication, as is found to be the case in the nasal pulse; nor do we find the presence of a small protuberance which raises itself in the middle or central part of the pulsatile artery, as happens in the pectoral pulse. The organic character of the guttural is distinctly different from that of both pulses. In the first place, it should be observed, that its character arises from the orgasm which Nature excites in the glands of the throat, in the presence of the matter of the crisis; and in the second place, that it discovers itself to the touch with a swelling of the part rather posterior of the pulsatile artery, which there shows itself wavy formed; its beatings are free, rather hard, developed and somewhat strong.

The observation of the simple guttural pulse is uncommon; it is more frequently found combined with the pulse of irritation: under this form we meet with the guttural pulse in complaints of the throat, followed by the excretion of different mucous, viscous or purulent matter. At the commencement of such diseases the pulse is thin, small, hard, quick and irritated; hence, after a certain interval of time, it again extends, elongates,

extrinsicates, and elevates itself, becomes somewhat soft, and at length shows, a little towards the posterior part of the pulsatile artery, the above-mentioned swelling, which forms the distinction of its intrinsic and radical character: hence every thing concurs to enable us to form a well-founded prediction of the critical excretion of the glands of the throat, which is operated within them, unless suppressed by some new dispositions of Nature, or retarded and stifled by sinister accidents or baleful causes. Numerous are the practical observations which can be adduced in support of this description.

PRACTICAL OBSERVATIONS.

AN inhabitant of New York, aged thirty-eight or forty, and of a strong constitution, was attacked by an inflammatory angina, which terminated by suppuration taking place in the amygdaloid glands. From the commencement till the end of the fifth day of the disorder, the pulse was agitated, frequent, oftener close, tight and hard; on the sixth it became full, developed, somewhat soft, and from time to

time redoubled; its mechanical character distinctly pronounced itself, and the egestion of the pus or purulent matter appeared towards the evening of the seventh day of the disease.

A Parisian lady, forty-five years of age, of a delicate constitution, was on the point of losing her menstrual purgations, when she was attacked by a sore throat, in which the amygdalæ were obstructed to the highest degree. Leeches, to the number of eight, were applied to the external region of the throat, and the pulse continued, notwithstanding, in the state of irritation. On the fourth day the pulse changed, and from small, thin, agitated and irritated, it became full, dilated, rather quick, and developed; on the fifth it discovered its mechanical character under the form of a wavy swelling towards the posterior part of the pulsatile artery, and the excretion of much pus-like matter took place on the seventh, and continued for two days. This observation is common in variable climates, and takes place above all in scrophulous persons. All those who have not the throat or neck well formed, whilst they are frequently subjected to sore throats, especially during sensible changes in the atmosphere, likewise afford, for this

reason, the opportunity of studying the character and progress of the critical guttural pulse ; because, every time the fever increases, the guttural pulse changes along with that of irritation ; it maintains itself under this form of convulsive pulse for a short space of time, and when no *relapse* opposes itself to the efforts of Nature, and consequently to the work of the concoction of the critical matter, from convulsive the guttural pulse becomes critical ; that is, elevated, rather soft, frequently redoubled from time to time, frequent, and calculated to enable us to predict the critical excretion of the glands of the throat with the wavy form, which extrinsicates, for the reason above seen, the swelling of the part rather posterior of the pulsatile artery, and which makes it distinct from its intrinsic character.

We therefore ingenuously confess, that the true critical guttural pulse is observed in those suppurations alone which are operated in the parotides, or other glands of the throat, in consequence of the crises, which judge certain epidemic fevers, usually prevalent in the summer seasons of hot climates, to be of a malignant character. In fact, the guttural

pulse is not, in these, as in the other cases, so openly irritated; scarcely is a mere hint or indication of irritation to be perceived, a circumstance which is not found to be the case in excretions immediately resulting from diseases of the throat.

ART. IV.

OF THE PECTORAL CRITICAL PULSE.

THIS is the pulse which precedes, announces, and accompanies the critical excretions of the breast, from which it takes its name of pectoral. It shows itself developed, free, soft, full, dilated; and its oscillations succeed in equal times. It is strong, but its strength imparts no disagreeable impression to the organ of touch, because its beatings are attended with flexibility and softness. These, from their not being openly double, as in the nasal and guttural pulses, resemble rather so many waves which succeed each other freely, that is, without effort and violence. In short, the rigidity or tension of the nasal and guttural pulses, is found, in the pectoral, obscured, deteriorated or weakened, in consequence of the physical condition of the lungs, to which we must refer the cause of the almost insensible redoubling and rigidity or tension of the dia-

stoles of the pectoral pulse ; diastoles which do not, on that account, arrive at the touch with that asperity, irritation, or difficulty with which the beatings of the nasal and guttural pulses are effected ; and it is for this reason that, as we have said, the beatings of the pectoral critical pulse resemble so many waves, which succeed each other with flexibility and freedom.

It might, however, happen, that all the secondary qualities of the critical pectoral pulse do not always show themselves in every case so distinctly pronounced, or that they do not convey to the senses those traits of analogy which comprise in one section this and the other superior pulses ; when this is the case, the method of distinguishing the pectoral pulse from the other two, by the aid of its mechanical character, should always be preferred as that which accompanies and follows it everywhere, whilst at the same time it distinguishes it from the nasal and guttural pulses. The mechanical character of the pectoral pulse consists, as we have frequently observed before, in a sensible elevation of the middle or central part of the pulsatile artery, an elevation which resembles, in no small

degree, a mount or hillock, the pulsations of which appear to the touch, full, strong, dilated, distinct, soft, obscurely redoubled, and slightly, or scarcely at all, rigid and tense.

In fact, the central part of the pulsatile artery is found thus elevated, in the presence of the critical matter, in the course of certain continued fevers, whose character is very frequently judged by the expectoration. Care must, however, be taken to avoid the error of taking its elevation, dilatation and strength, for an effect of plethora, or an excessive fulness of the blood-vessels ; for such a mistake might very easily give rise to the false notion of incautiously having recourse to bleeding, purging, and other antiphlogistic remedies, when these would not fail to overturn the order of Nature's operations ; an error, unfortunately, not of rare occurrence in practice. The object here is to distinguish when the elevation of the pulse results from the presence of the critical matter, in a given organ, and when it arises from the excessive fulness of the blood-vessels, independent of this cause. When once every medical practitioner has made himself acquainted with the various organic characters of the different critical pulses, there will certainly be no longer any chance of the

recurrence of the error of confounding the elevation, dilatation and strength, which certain critical pulses acquire in the presence of the critical matter, with the elevation, dilatation and strength, which are the result of the state of plethora, of the excessive excitement, or of the violence of this or that hypersthenical disease.

We should have occasion to remark still more errors of this description, but for the ascendancy which the observations of the ancients, confirmed by time, have justly had over the human mind; it is this reason which has induced us to reproduce the remarks of the ingenious and learned Fouquet upon this subject. In his work already quoted, he speaks of a young Frenchman, who was attacked by a putrid fever, and who unfortunately died, from his medical attendant not knowing precisely the organic character of the critical pectoral pulse. Fouquet relates the case in the following words :—

“ Un jeune garçon perruquier, âgé de 24
 “ ans, sur la fin d’une fièvre putride, a le pouls
 “ pectoral. J’interroge conséquemment le ma-
 “ lade : il m’apprend qu’il a passé la nuit dans
 “ les inquiétudes de la fièvre et avec une diffi-
 “ culté de respirer ; mais qu’il se sent mieux,

“ qu’il toussé et expectore : il me présente en
 “ même-temps, dans son crachoir, plusieurs
 “ crachats qui sont bien liés et bien cuits.
 “ Cependant le médecin arrive ; et trouvant de
 “ l’élévation, de la force et un peu de fré-
 “ quence dans ce pouls, il ordonne une saignée
 “ pour le soir et une purgation pour le lende-
 “ main. Le pouls, après ces remèdes, n’est
 “ plus marqué au pectoral critique ; la purga-
 “ tion a laissé une espèce de cours de ventre,
 “ les crachats sont supprimés, la respiration est
 “ gênée, et la maladie semble, en total, prendre
 “ une mauvaise tournure. On n’ose plus ten-
 “ ter des remèdes sur le malade, en le voyant
 “ dans cet état, et il est livré entièrement à la
 “ nature pendant trois jours, après lequel
 “ temps le pouls redevient pectoral critique
 “ avec force, quoique avec émotion ; les crachats
 “ reparaissent, la respiration se trouve libre, le
 “ malade a un autre coup d’œil, et tout semble,
 “ une seconde fois, se déterminer favorablement
 “ pour lui : mais cet état de force, d’élévation
 “ et de trouble dans le pouls, en imposant
 “ encore au médecin, le malade est de nouveau
 “ saigné et purgé, ce qui occasionne une
 “ rechute plus mauvaise encore que la pre-
 “ mière. Enfin, cette espèce de lutte entre la
 “ nature et le médecin ayant été renouvelée

“ plusieurs fois encore, et les forces du malade
 “ se trouvant entièrement épuisées, ce dernier
 “ meurt environ le vingt-sixième jour de sa
 “ maladie.”* Such are the fatal consequences
 of the prejudice which forbids us to profit by
 the light which the science of the pulse diffuses
 over practical medicine !

To this may be added another observation ;
 namely, that the use also of tonic remedies
 can prevent the developement of expectoration
 in certain cases, or suppress the course and
 continuance of it, when those remedies are
 administered where they are unnecessary.
 Expectoration, as well as all the other critical
 excretions, are the work of Nature, who,
 when not overcome by the extenuation of the
 vital powers, is in no want of tonic remedies ;
 she only then requires art to second her, or to
 follow discreetly her operations, to the happy
 result of which the action of such remedies is
 directly opposed.

Every circumstance convinces us that Na-
 ture turns out of the road which leads to the
 developement of the critical excretions, when
 from caprice, from system, or from ignorance,

* See Fouquet, *Op. cit.* p. 176 and 177.

tonic remedies are administered, while she herself was fully adequate to develop and produce them. Often have we seen the expectoration disappear in certain catarrhal fevers, from the use of Peruvian bark, whilst in other diseases of an hyposthenic nature, expectoration has been visibly promoted and favoured by the action of the same bark: so that when Nature is not wanting in force or energy to effect the expectoration, or any other critical excretion, it is useless to molest, or to divert her from her salutary efforts or operations by the use of tonic remedies. The same is to be observed of the effects of bleeding, purges, and any other antiphlogistic remedy; since all their effects oppose the intention of Nature, when the excessive vigour of her powers does not show the want, the use, or the practice of them; an instance of which is to be seen in the above-mentioned case related by Fouquet.

The diseases in which the crisis of the breast, and the critical pectoral pulse which announces its approach, take place, are catarrhal fluxes, obstructions in the organs of the breast, occasioned by cold drinks, fluxes of the breast, accompanied with spitting of blood, pulmonia, pleurisy, and various acute

fevers. But it is not this knowledge alone which should always be present to the medical practitioner ; he must accompany it with the maxim of not following the same method in the treatment of all the above-named diseases. In some of these, it will be necessary to adopt the system of Hippocrates, or of Stahl, by merely waiting for the result of the salutary efforts of Nature, as happens in acute disorders slightly hypersthenical : in these, the vital powers being free from the defect either of an excess of tone, or from the opposite one, of a too great want of it, there is, consequently, no need for powerful remedies of art : in others, as in pulmonias, and in pleurisies either true or hypersthenical, their fortunate termination would be fruitlessly, and with the utmost danger to the patient, awaited, without weakening their violence and strength by general and local bleedings, according to the object of the indication ; and in many others finally, neither of these methods of treatment is to be adopted. This is the case in false, spurious or asthenic pulmonias and pleurisies, and also in all the above-named disorders, when they are either directly or indirectly caused by a state of languor, or prostration of the vital powers.

In fact, it is Nature which operates and successfully produces the critical expectoration, when her salutary efforts are not paralyzed, either by the violence of the exercise of the organic functions, or by their oppression or prostration: it is in the medium between these two extremes that Nature finds the certain and secure means of producing the expectoration or any other critical excretion, and consequently of triumphing over the resistance opposed to her by acute disorders: in this mediate state, therefore, there is no need of tonics, or of antiphlogistic remedies; the efforts of Nature, in producing one or other critical excretion, being, as we before observed, sufficient. In short, it is here necessary to follow the practice of Hippocrates, Stahl, and of so many other disciples of the doctrine of the crises.

But the case is entirely changed in true or hypersthenical pulmonias or pleurisies, as well as in the other acute disorders of excess of vigour, in which the Hippocratic practice is, as we have before said, altogether opposed to their favourable issue; it is rather necessary to diminish the sphere of activity of the organic actions by the use of bleedings and purges: life being relieved of this exuberance

of vigour, Nature must feel herself unembarrassed; and, being then more free, can promote and produce expectoration by her free motions. Lastly, the other case in which the Hippocratic practice should not be followed, is that of all the lately-mentioned diseases, when the state of languor, or the prostration of the vital powers, is fundamentally, as we have said, either the direct or indirect cause.

In the state of languor and depression, Nature cannot make the least salutary effort: the weakness of her endeavours, the obstacles of various kinds which are opposed to her; the sluggishness of the organs, the then invincible resistance of the disease; these and so many other causes do not allow Nature to modify, change, soften, or concoct the morbose matter; the action of the crisis, and consequently the critical excretion, must fail; and when the crisis takes place, it is of no utility, because it has not been preceded by the concoction, and the critical excretion which is operated by the violence of the irritation cannot but be false, forced, and symptomatic.

In this last case, it becomes necessary to elevate the sphere of activity of the vital organs, augmenting the excitement, strength

and energy, by the use of tonic remedies : in this manner Nature recovers the tone which is requisite for exciting the accustomed critical revolutions, and thus succeeds in her object of concocting the morbose matter, and of expelling it by means of expectoration. Such at least is the result of the following practical observations.

PRACTICAL OBSERVATIONS.

A CATARRHAL fever, accompanied by a pain in the left side of the breast, attacked an inhabitant of Philadelphia, aged 62, and of a meagre complexion. The pulse continued more or less to be always thin, small, hard and irritated, till the fifth day of the disease : a large blister was applied to the side affected, and he was made to take in small doses a decoction of *polygala virginiana*, strengthened by the syrup of poppies. The pulse, from small, thin, hard and irritated, became, on the fifth day, sufficiently dilated, full and developed ; on the sixth it manifested its mechanical character, which showed itself in the middle part of the pulsatile artery, under

the form of an eminence, and the expectoration took place on the seventh day, which was followed by the patient's recovery two days afterwards.

This observation is confirmed still more by its being a certain fact, that Nature, who is usually weak, and little, if at all, efficacious in acute diseases, especially asthenic ones, in individuals of advanced age, cannot, for this double cause, display that strength and energy which she does not possess, when occasion requires. Hence, we were induced, in the case above mentioned, to have recourse to the stimulating actions of the blister, of *polygala virginiana*, and of opium; and by the help of these remedies Nature succeeded in concocting and expelling the critical matter by the mechanism of the expectoration. In various cases of spurious pleurisy, or of false and asthenic pneumonia, we have in like manner obtained the critical excretion of the breast, by means of the use of the extract of bark dissolved in a sufficient quantity of syrup of roses, and of a large blister applied to the affected side of the thorax. Now, who does not see how strange would have been the idea of preferring, in this case, the Hippocratic practice?

A young Neapolitan lady, of a good constitution, and about twenty-four or twenty-five years of age, was attacked by a continued catarrhal fever. I was called in to visit the patient on the fifth day of the fever. The pulse was hard, strong, and quick, especially in the left wrist, corresponding with the side of the breast in which she felt a severe pain, which rendered her respiration difficult. She was bled copiously, and twelve leeches were applied six hours afterwards. On the seventh day, the pulse became full, dilated, elevated, and more frequent than in the natural state; on the eighth were observed a slight reduplication, and a degree of softness calculated to give a foresight of Nature's intention; then it showed itself with the usual eminence or elevation of the central part of the pulsatile artery, and there was then no longer any hesitation in predicting the critical excretion of the breast, which took place on the ninth day, when the patient experienced a complete cure.

From this observation it appears clear, that, by removing the cause of the morbose elevation of the organic actions, as the indication required, Nature was relieved by means of the general and local bleedings, and therefore,

by the antiphlogistic method, from that state of violence which constituted the external character of the hypersthenic catarrhal fever. By the general bleeding the phlogistic diathesis was diminished, if not wholly dissipated; while the leeches removed the local congestion, or obstruction of the small blood-vessels, which occasioned the pain experienced by the patient in the left side of the breast. In short, the object in this case was to lower the too-elevated sphere of activity of the organs, since Nature, freed from the excess of strength, re-acquires that agility and liberty of her motions, by which she usually effects the crisis.

And in many other cases of slight phlogosis of the breast, or of trifling colds, in which the organic functions were not much altered from the natural state, we have promoted the critical excretions of the breast with the use of barley-water only, rather tepid, and mixed or sweetened with honey of roses. The whole secret, therefore, of bringing about a regular and happy termination to acute disorders consists in seconding the movements of Nature in the work of the crises, when it tends to this object: now her movements or efforts are seconded in three ways: 1° By moderating the excess of the vital powers, when these are too

morbosely elevated; 2° By increasing and augmenting the vital energy and strength, when these are weakened, deteriorated, and depressed, as happens in malignant fevers; and finally, by adopting a third method, viz. that of not disturbing Nature from her occupations and regular work, when the case does not require strong and violent remedies, as occurs in acute diseases, slightly phlogistic, which generally yield to a plan of treatment purely negative, or, which is the same, to the Hippocratic practice.

SECTION II.

OF THE INFERIOR CRITICAL PULSES.

THERE is certainly a material difference to be observed between the superior and the inferior critical pulses: the former, as before observed, manifest themselves with the elevation, fulness, dilatation and strength of their beatings; while the latter are characterized in a general manner by the lowness, closeness, depth, smallness and inequality of their pulsations; the first precede, as has been said, the critical excretions, which are effected by the superior organs; whilst the last, which we now intend to examine, announce and precede the critical evacuations which take place in the inferior organs.

ART. V.

OF THE STOMACHAL CRITICAL PULSE.

To the section of the inferior pulses properly belongs the stomachal pulse; we mean that which precedes the access of the spontaneous vomiting effected by the stomach, which is placed under the diaphragm. Whether the ventricle is incommoded by spasm or pain; whether it resents the impression made upon it by the presence of any bilious, viscous, or indigestible matter; in these two cases there is always accessible to the touch, the small pyramidal eminence which then rises between the tip of the index and that of the middle fingers, as we have before noticed in the description of the stomachal organic pulse.

This, in the quality of inferior pulse, cannot but participate in closeness, smallness, tension, depth, and irregularity, modifications of the artery which make the division or distinction of all the inferior pulses. The irregularity of the stomachal pulse arises expressly from the

greater or less smallness or concentration of its beatings, or from the unequal times in which these succeed each other. Sometimes the intervals which intervene between its diastoles, are so long and protracted that they exhibit there a kind of intermittency, an intermittency which concurs in distinguishing the stomachal pulse from the superior ones in which it does not exist, and also from the convulsive pulse of the ancients, or from that of irritation of the moderns, this also being small, deep, thin and straight, but not intermittent, like the stomachal pulse.

The difficulty does not consist in distinguishing this critical inferior pulse from the superior ones, and from the convulsive pulse, or from that of irritation, but rather in distinguishing it from the various critical inferior pulses themselves; as well for the reason that all these have common qualities, qualities derived from their reciprocal nearness of situation, and from the uniformity of the action of the nerves which proceed from the same ganglia; as because it is not rare, even in practice, that Nature directs the matter of the crisis to more excretory organs, alternately or contemporaneously near; and all this concurrence of circumstances produces an indetermi-

nate series of gradations in the critical inferior pulses, and consequently renders the distinction between them difficult.

But when we reflect that every excretory organ has a structure peculiarly its own, to which the character of the pulse, announcing its operations and preceding the crisis, must necessarily correspond; when this is considered, it will be easily conceived that every inferior critical pulse must likewise preserve a distinct and individual character; a character which we find expressed by the various configurations assumed by the pulsatile artery in the various critical inferior pulses, as we shall have occasion successively to observe in their description.

The object, however, to be considered, and which appears to us of no small interest in the exercise of practical medicine, is to show that the stomachal pulse, whilst it is not critical, as others think, serves for no other purpose than to advertise the presence, not of the matter of the crisis, but of the bilious, viscous, and indigestible materials which may agitate the stomach, especially in certain gastric, and bilious fevers, or such as arise from change of air.

The certainty of the stomachal pulse not

being critical, arises, as we shall see, from three causes. It is not critical, because sometimes it arises from one, and sometimes from another disease, and as a symptom or effect of this, or of that disorder, it cannot be, at the same time, the work of Nature, or the result of her efforts; it is not critical, because the stomach does not appear to be an organ competent to judge the acute disorders, and other organs capable of operating the crises we are not acquainted with, when we except the various excretory organs and the system of the circulation of the blood; this prepares the matter of the crises for the concoction, and those completely effect them, and hence it does not appear correct to include the stomach in the class of the excretory organs, even although its structure might allow of its being so classified; and lastly, we adduce, for our third reason, the intention of Nature herself, who never dreamed of making the stomach an excretory organ: every other function might be fulfilled by it, and it would be absurd to suppose that Nature could concentrate there the humours of the crises.

The fact of the bilious and indigestible matter being rejected by the efforts of the stomach in a state of disease, in no degree

proves that the vomiting is critical. It must first be observed, that the phenomenon of vomiting takes place at the commencement of certain diseases, and it cannot be believed to be critical, when it does not take place at the usual time of the true crises. Moreover, the difference is most palpable between the concocted or excrementitious substance and the bilious or indigestible materials rejected by the stomach: these are found there accidentally, and are not transported thither by the movements of Nature; they are not concocted or altered from their natural character, and in truth have nothing to do with the substance cemented by Nature, through the means of the circulation of the blood, and the reiterated efforts of the excretory organs. Finally, it does not likewise appear, from practical observations, that acute disorders, followed by vomiting, terminate their course regularly.

The most we observe is, that spontaneous vomiting momentarily relieves the patient, especially when the emetic was not administered to him in time, whilst it was well indicated. At least this is found to be most generally the case in gastric and bilious fevers, or those of other kinds, which are met with

united to visceral embarrassments. Besides, in every other case, spontaneous vomiting is either injurious, as happens in the yellow fever, and in the *cholera morbus*, or it forms an obstacle to the administration of remedies. Bordeu, it is true, admits the critical stomachal pulse, complicated with the pulse of irritation, which is observed, he says, at the moment that the action of the stomach is determined towards the intestinal tube, or in other words, that according to Bordeu the stomachal pulse is critical when it precedes the diarrhœa : the intestinal pulse, therefore, which precedes the diarrhœa, is critical, and not the stomachal pulse, which announces the vomiting. In one word, vomiting from a humoral effort of the stomach, and not from the operations of Nature, is scarcely or never observed in the course, or at the end of acute disorders ; it does not produce the usual effect of the true crises, which judge them favourably, and the substance thrown up by the stomach is not at all concocted, as it should be, if Nature had cemented it by the complicated operation of the crises : spontaneous vomiting is therefore symptomatic, not critical ; and such is the stomachal pulse, which announces and follows it.

PRACTICAL OBSERVATIONS.

A MECHANIC of Altamura, province of Bari, in the kingdom of Naples, about 30 years of age, and of a strong constitution, was attacked by a bilious fever. The pulse was hard, thin, tense, unequal and quick; the artery appeared to tremble under the fingers; the small pyramidal elevation, which is the intrinsic characteristic of the stomachal pulse, showed itself between the tip of the index and middle fingers, and the patient complained of the uneasiness of the stomach and of the impulse he felt to vomiting. Spontaneous vomiting came on in a few seconds after, and a considerable quantity of aqueous matter, of a yellowish-green, colour was ejected: the patient was momentarily relieved by it. The next morning the mineral emetic was administered to him, which produced a much greater effect than the spontaneous vomiting: notwithstanding this, however, the fever continued its course, neither the spontaneous vomiting, nor that produced by the emetic, having been able to stop it. On the eleventh day, the intestinal critical pulse, which

we shall shortly notice, appeared, and the critical diarrhœa, which lasted by intervals for two days and some hours; the bilious fever began to be dissipated, and the patient was entirely free from fever on the fourteenth day of the disorder. Hence, it does not appear that spontaneous vomiting is critical.

A German of adult age, and of a rather strong constitution, on his return from the Havannah to Philadelphia, was attacked six hours after his arrival by a fever produced from change of air, which showed itself under the external character of a gastric fever, accompanied by nausea and vomiting: these were far from affording the least relief to the patient, on the contrary they rather weakened him, and sensibly diminished his strength. For the purpose, therefore, of preparing him with the known means of art, vegetable acids diluted in tempered water, purges and diaphoretics were generally administered to him, with the view of keeping the system of perspiration in a state of activity, and through these the patient obtained considerable advantage. The use of extract of bark and of mixture of camphor finally arrested the course of the fever on the seventeenth day, without

the least sign of any crisis. We might adduce many other instances of gastric or bilious fevers, in which the spontaneous vomiting has never been critical, if occasion had required it.

ART. VI.

OF THE INTESTINAL CRITICAL PULSE.

THE critical evacuations effected by the intestinal tube in the course of certain acute disorders are announced by the pulse, which is on that account called intestinal critical. This, like the other critical pulses, is kept up throughout the time of the crisis; and, when this performs its natural course incompletely, the critical intestinal pulse continues notwithstanding to manifest itself; in such case, however, it is observed in conjunction with the pulse of irritation, which is always, as we have said, in opposition with the perfect concoction of the critical humours, and therefore of bad augury.

One amongst the other qualities which must contribute to the critical character of the intestinal pulse, is that of not being so hard, tense and concentrated, as the stomachal pulse; to this quality is owing the advantage of distinguishing it from the latter, and

of confirming still more the physical certainty, that the first is critical, and the second symptomatic; thus, the more this differs from that, showing itself harder, more tense and concentrated than the intestinal pulse, the more sensible is their difference. That which indicates the critical character of the pulse is quite the opposite of hardness; it is the softness or flexibility which variously concurs in it, and decides upon its merit. Hence, the more the intestinal pulse inclines or tends to softness, the more decisive is the critical character resulting from it; on the contrary, its critical character diminishes in proportion as its hardness, rigidity and tension increase.

Sometimes the beatings of the intestinal pulse are also elevated, developed, round and somewhat strong, upon the first approach of the exploratory organ; so that it might then assume the features of a superior pulse; but, when due attention is paid to its irregularity, and, above all, to the confusion which pervades its various inequalities, the momentary embarrassment of the mind is removed, and there remains not the least reason to believe it to be a superior pulse. It is to be observed, that the intestinal pulse is exceedingly irregular, and its irregularity respects not only its mode

of beating, or its rhythm, which vary one from the other; but also the time required by its diastoles, and which intervene among each other. This is certainly not the case with the superior pulses, where this kind of irregularity belonging to the intestinal critical pulse does not exist, and much less the intermittency, which is another of its qualities. In other respects, even admitting with Bordeu, that the critical ventral evacuations could, in certain cases, be effected without the intermittency of the pulse which announces them, it is no reason that the intestinal pulse should ever succeed in elevating and dilating itself, and in beating with such force as to be confounded with the superior pulses; but it is so seldom that the intestinal pulse is not intermittent, that the celebrated Solano predicted the approach of the critical ventral evacuations from the presence of its intermittency alone. Galen, Aëtius, and several other ancient physicians observe, that the intestinal critical pulse consists in the concentration and inequality of its rhythm.

Every difficulty absolutely vanishes before the light thrown upon the subject by the presence of the mechanical character of the intestinal pulse. In whatever manner the intestinal

pulse may beat, whether it be intermittent or not, it is always distinctly represented and expressed by its organical character, as soon as Nature directs the matter of the crisis to the intestinal tube, and there concentrates her movements. The organic character of the intestinal critical pulse is produced by means of the orgasm or agitation, which the efforts of Nature and the matter of the crisis excite in the intestines. Its organic character is expressed in the following manner.

The anterior part of the pulsatile artery, which is also called digital, is close, thin, and concentrated; and its concentration varies in proportion to the character of acute disorders in which the crisis takes place, and according to the age, sex, temperament and state of the vital powers: in the above-mentioned space of the artery, is felt, sometimes in every diastole, at others in every two, three, or more beatings, an impression which appears as if produced by a small globe of blood, which becomes elongated and attenuated, extending itself like a body endowed with great ductility, if we may be allowed so to speak; and which, acting in this manner, proceeds to strike against the tip of the index, beginning from the inner side of the middle

finger. Fouquet compares such an impression to that which is produced by a small bone, a dart, or a pin, the head of which slightly strikes the tip of the index finger. But whether it be this or that impression, there is no doubt of the beating of the digital part of the pulsatile artery, as if some foreign body were withinside it, and acting in the manner above described, in the presence of the matter of crisis in the intestinal tube.

The degree of expression of the organic character of the intestinal critical pulse likewise varies with all the partial circumstances of the patient in whom the crisis takes place. Youth, the male sex, a delicate constitution, a warm climate, a good state of the vital powers,—all these partial circumstances have a favourable influence upon the development and degree of expression of the organic character of the intestinal pulse; and when it happens that such a character is developed and expressed, in the absence of the above-mentioned circumstances; this would be a sufficient ground for predicting a longer and more copious excretion of fæcal matter.—Before the celebrated Fouquet produced, as the result of his enlightened observations, the doctrine of the organic characters of the various

pulses, the attention of the faculty was directed to the frequency and duration of the intermittency of the intestinal pulse, for the purpose of prognosticating the speedy arrival of the diarrhœa, and the greater copiousness of the critical matter. In support of what has been advanced in this description, the following practical observations are adduced.

PRACTICAL OBSERVATIONS.

AN inhabitant of New York, of an adult age, and of a strong constitution, was attacked by a malignant or typhus fever : I visited him on the fifth day of the disorder, up to which time two purges had been administered. The pulse was frequent, lively, inclined to be strong, and most often equal : such it continued, more or less, till the tenth day. On the eleventh it became variable, some of its oscillations being stronger, others smaller ; some employed a very short time, whilst others, again, a longer time than usual ; the length of time between some of its diastoles sensibly increased, and the intermittency took place

between every eight or ten diastoles; the above-mentioned impression of a small dart made itself felt under the tip of the index finger, so that there could be no mistake, and every thing concurred in predicting the approach of the critical evacuations, which in fact arrived on the fourteenth or fifteenth day, and the patient was completely restored to health on the twenty-first. It is to be remarked, that in proportion as Nature redoubled her efforts in the intestinal canal, for the purpose of completely concocting the matter of the crisis, the pulse never failed to display still more and more its organic character, as may be gathered from the more palpable blow given by the above-mentioned dart, and by its intermittencies, which became more distinct and more frequent on the approach of the crisis.

That the deteriorated state of the patient's vital powers contributes to the unfavourable issue of acute disorders, is a truth which, if not decided by the failure of Nature's efforts, may be deduced from the following observations:—A Neapolitan lady, sixty-six years of age, and of a delicate constitution, was attacked by an ataxic fever. The pulse always continued small, thin, concentrated and quick, till the

eighth day of the disorder, notwithstanding every endeavour to ameliorate its state and condition. All efforts to make it assume the character of a critical pulse were unavailing. It was not till the thirteenth day that it changed, and became irregular, jumping, and intermittent, in every seven, eight, or nine pulsations; but its intermittencies were not decisive, distinct and marked, as they are generally found to be; it was scarcely possible to distinguish the blow of the dart in the digital part of the artery, and the whole of the other symptoms of the disorder assumed a sinister aspect. On the fifteenth day the pulse returned to its first state, that of being rather convulsive and irritated, and continued thus till the seventeenth. On the eighteenth there was felt upon the pulsatile artery, instead of beatings, a kind of vermicular motion, and the patient died in the night of the twentieth day, although two eminent physicians of that metropolis had, in conjunction with myself, employed the most efficacious means of art to save her.

There are two obstacles that generally oppose the favourable termination of malignant fevers which attack persons of advanced age; the languid state of their organs, and the

obtuseness of the vitality, which is in them worn out and almost exhausted by the accumulation of years. As this second obstacle is but rarely found in young and adult patients, it is not therefore so difficult to save them from the attacks of fevers of a malignant character; on the other hand, the remedies stimulate and revive their excitability, and consequently the vital powers. Hence, in individuals not advanced in years, it becomes easy to second the efforts of Nature, so as to enable her to triumph over the severity and obstinacy of acute disorders. The following is a case of this description:—

A lawyer, a native of Putignano, residing at Naples, thirty-eight years of age, and of a delicate constitution, was attacked by a typhus or nervous fever, which grew worse daily, although every remedy proper for his case was administered. The pulse maintained itself small, close, deep and quick, till the sixth day of the disease, or at least its variations were trifling; on the seventh it became as if jumping and unequal; from its inequality it was observed to be soft in some, and rather straitened and rigid in other diastoles; of the intervals some were longer, and others shorter and more brief; its organic character

was found to be lightly or obscurely expressed ; so that it appeared clear that Nature was making every effort to effect her intentions, which succeeded but in a small degree. This state of things continued from the seventh till the tenth day, a period sufficiently long for the certain inference to be made that the organs wanted force and energy sufficient to effect the concoction of the matter of the crisis. A table spoonful of a mixture of camphor and musk was then administered to the patient every two hours, and by the help of this powerful tonic, Nature triumphed, as on the fourteenth day the ventral excretions of putrid matter came on, being preceded by the appearance of the organic character of the intestinal critical pulse, accompanied by its intermittency, and the patient was restored to health on the twentieth day.

In other cases of acute fevers, in which Nature equally required the assistance of art, recourse has been had successfully to different kinds of purges ; and by their action, which has roused, so to speak, the sensibility of the intestinal canal, paralyzed by the oppression caused by the mass of the critical matter, Nature has succeeded in effecting its expulsion. Let the reader consult the

luminous observations of Daniel Cox upon the intermittent critical pulse, which indicates the use of purges. Frederick Hoffmann is also deserving of the attention of the physician, for his observations upon the intermittent critical pulse, which instead of being the indicatory sign of death in acute disorders, according to the general opinion of physicians, more frequently announces that Nature is intent on preparing a crisis, which it is requisite to second in case of need, either by tonics, by purges, or by any other better-indicated remedies.

All the difficulty of succeeding consists in knowing how to distinguish the different causes from whence proceed the intermittency of the pulse ; this may arise from exuberance of humours, or from plethora, an instance of which we find in the practical observations of Pietro Salio, and Prospero Alpinus. The one, by means of the intermittence of the pulse, predicted certain asphyxiæ and syncope, and prevented their return by bleeding and purges ; and the other succeeded in dissipating, by the same means of art, even the intermittence of the pulse in an inhabitant of Cairo, who fell ill from the effects of an excess, and to whose assistance Alpinus

was called in. Wierus, Hoffmann, Solano, Nihell, Daniel Cox, and several other eminent physicians have also succeeded in removing the intermittency of the pulse, by promoting the critical ventral evacuations by means of purges. When Wierus observed that the intermittent pulse was rather strong, he never hesitated to order a purge, and by this enabled Nature to decide the critical evacuation of the belly, and immediately caused the intermittency of the pulse to disappear. This example has been followed by Hoffmann and Daniel Cox, who have left, as we before observed, luminous observations upon the same subject, in which the utility of purges is shown in acute disorders followed by the intermittent critical pulse.*

Besides, however, this species of intermittent pulse, which is not, as was sometimes believed, an indicatory sign of death in acute disorders; there are several others, the malignant character of which may inspire well-grounded alarm. Of these one is that which arises in indicated disorders from spasm, oppression or irritation of the epigastric nerves,

* See those authors in the History of Sphygmica.

or from a disorder of the whole nervous system. This is the case of nervous apoplexy, and also of certain adynamic, ataxic or malignant fevers, in which the intermittency of the pulse is never isolated from the smallness, weakness, rarity, or slowness of its rhythm, and from the other symptoms of death. The other is that which takes place in organic diseases, such as the ossification of the auricles and ventricles of the heart, of the arterial trunks, of the valves of the aorta, or of the centre of the diaphragm; the aneurism of the same ventricles, or of the large arterial vessels, hydrothorax, and similar organic affections: and if the intermittency of the pulse is not in all organic affections of the breast an immediate sign of death, it does not the less cease to announce the serious and certain danger which threatens the patient's life. The other species of intermittent pulse which causes alarm in acute disorders, is that which results from profound atony, or extreme weakness, and from prostration of the vital powers. This species of intermittency of pulse is also considered as an inauspicious and fatal sign; because, where the nervous energy is weakened or oppressed, and where the vitality is almost exhausted, there is nothing to

be hoped for from Nature overpowered, and ready to yield to the severity of the attacks of the disorder, and much less from the action of the remedies of art, however strong or active, since these produce no effect upon the vitality, worn out and almost extinguished by the obstinate character of the disorder.

ART. VII.

OF THE HEMORRHOIDAL CRITICAL PULSE.

THE hemorrhoidal pulse participates in the inequality which characterizes the section of the inferior pulses; but the form which its inequality assumes belongs to it alone, is proper and peculiar to it, and distinguishes it from the other inferior pulses. Its beatings are at one time more, at another less concentrated: the first two, four, or six oscillations are less concentrated, rather lively, somewhat hard to the touch, and almost equal; to these succeed two, three, or four other rather dilated, as if they were round and less equal; and afterwards two, four, and six more with rebounding; in these inequalities there always predominates a certain trembling, which joined to the frequency and to the concentration of its rhythm, constitutes and forms, according to Bordeu, the distinctive character of the hemorrhoidal critical pulse. The other qua-

lity belonging to it is that its inequality never assumes the form of intermittency.

Now, when to the above-mentioned qualities, which we consider rather of a secondary order, is added a slight granulous formication which is observed in the digital part of the pulsatile artery, or a species of small round bodies, which follow each other successively; when this is observed, there is no longer any doubt of the presence of the hemorrhoidal pulse; because both these modifications of the pulsatile artery constitute its intrinsic or radical character; and it is precisely this pulse which announces the access or the presence of the sanguineous flux of the intestinal rectum. And in order that this may not be confounded with the other pulse, which indicates the approach of the bleeding at the nose, or with that which foretels the arrival or the presence of the menstrual purgations; in order that neither of these mistakes may be made, it is necessary to keep firmly in the mind the peculiarity, that in this pulse, the impression which arises from the granulous formication, or from the action of the small round bodies, is always, *cæteris paribus*, lighter and weaker; an impression which is felt, as we have before observed, in the di-

gital part of the pulsatile artery. In short, the granulous formication is not so pronounced and so expressive in the hemorrhoidal pulse, as in the nasal and uterine pulses which announce the other species of hemorrhage; and when round bodies are felt sliding in the above-named part of the artery, instead of feeling the afore-mentioned granulous formication, another peculiarity is also to be remarked, that the round bodies are smaller and more round in the hemorrhoidal, less so in the nasal, and proportionably so in the uterine pulse. Thus, in one, the seat of the granulous formication, or of the small bodies, is confined to a less space, and in the others to a greater; and it is the lightness and circumscription of the granulous formication, and secondary modifications of the digital part of the artery, which establish the line of demarcation between the hemorrhoidal, and the other pulses which announce the arrival or the presence of the various hemorrhages of the human body.

To decide, from this information, whether the hemorrhoidal pulse is or is not critical, enters into the plan which we have proposed to ourselves, and agrees with the actual state of practical medicine; whilst certain pre-

judices still predominate, which oppose its improvement, and are connected with the object of this question. Examining, therefore, in every point of view, the phenomenon of the hemorrhoidal flux, we find that it is symptomatic and not critical. Such is at least the judgment to be formed of it from practical observation and reasoning.

First, it does not appear from the researches which we have made, that acute diseases, followed by the hemorrhoidal flux, cease to exist, terminating favourably their natural course, as they generally do when followed instead by the critical diarrhoea, expectoration, or sweat; and whilst, on one hand, we do not see the hemorrhoidal flux succeeded by the termination of acute diseases, we, on the other, remark that the hemorrhoidal is irritated, or is always accompanied by the pulse of irritation: it is so united with the other, that as yet no observation has been made which shows the contrary. It is moreover known, that the irritation is directly opposed to the work of concoction, and that there is no crisis in practice without the instrumentality of the concoction of the matter of the crises, which is the same. And this is the reason, which does not allow the hemorrhoidal pulse to take the character

of a critical one. It can certainly announce the obstruction or embarrassment of the hemorrhoidal vessels; it can also predict the arrival, or presence of the sanguineous flow of the intestinal rectum; but does not, on that account, acquire or merit the epithet of critical.

We ourselves agree, that there are multiplied cases in practice, in which the asthma, gout, vertigo, hysterics, hypochondria, and many other similar diseases, become weaker, more calm, and are even dissipated at the first appearance of the hemorrhoidal flow; but it does not thence follow, that the hemorrhoidal flux is critical, as the apparent or real improvement of the patient may be produced by a quite different cause. In the first place, it must be observed that the advantage derived by the patient from the hemorrhoidal flow is momentary; for we see that the above-named disorders terminate at the periodical time fixed by their character; we see the asthma, the gout, hysterics, hypochondria, and so many other physical disorders of this nature which can afflict man, reappear a short time after the hemorrhoidal flow has fulfilled its course. Is it for this that the hemorrhoidal flow, and the pulse which announces it, become critical?

And how can such a thing be credited, when the matter of the crises receives only the first steps of preparation in the system of the circulation of the blood? The matter of any crisis, in fact, cannot be modified, completely concocted, or reduced into a substance truly critical, unless cemented by Nature, in the crucible of the excretory organs; and this is certainly not the case with the hemorrhoidal flow, which originates in, and proceeds directly from, the hemorrhoidal vessels; and then the blood produced by it has not even the aspect, form or character of an excrementitious substance.

We do not deny to Bordeu, and to several others, who support the contrary, that many nervous women, whose menses have been suppressed, become relieved and even cured of the disorder afflicting them, on the appearance of the hemorrhoidal flow. But this would not prevent Bordeu himself, were he now living, from allowing, that the same disorder returns again as soon as the same obstruction, which is the cause of it, gradually establishes itself in the vessels of the uterus. And how will it be pretended, that the flow of the hemorrhoidal blood, which supplies the absence or defect of the suppressed menses, ought not to dissipate the

disorder, either of the nerves, or of any other kind, as soon as the sanguineous congestion, or the producing cause, ceases to exist ?

A disease of which a favourable judgment has been formed by a true crisis, is never again seen, when not reproduced by the same cause, or by another of a similar kind. The same however cannot be affirmed of the diseases which yield momentarily to the effects of the sanguineous flow ; these, if they are dissipated, reappear some time after. It is only the exuberance of the humours, which is found in women, and in individuals who lead a sedentary life, whilst they nourish themselves luxuriously, which imparts to the hemorrhoidal flow a merit that it neither does nor can possess ; but which it arrogates to itself with removing the excess of the humours, and by diminishing the accumulation, which generates in different persons in whom it occurs, disorders as numerous as the individuals themselves : so that the hemorrhoidal flux, dissipating as it does the various congestions, which are at different times formed in different viscera or organs, by good living and little exercise, it consequently dissipates the various diseases to which they are subject by reason of these causes. Thus, when once patients of

this description have contracted the habit of losing, by means of the hemorrhoidal flux, a few ounces of blood from time to time, the flow of blood from the intestinal rectum then becomes so necessary to them, that we see as the consequence of its suppression various disorders, if not severe diseases, which immediately give way, and cease to exist upon the return of the hemorrhoidal flux. But all these, and many other advantageous and salutary effects, resulting from the hemorrhage of the intestinal rectum, in no degree prove that this hemorrhage is critical; it rather proves the truth of the observation, that habit is a second nature, and that the loss of a few ounces of blood is the remedy which is required, and not the effect of the work of a crisis, which cannot be operated by the intestinal rectum.

Frequently have cases presented themselves in which it has been required to assist persons affected with diseases occasioned by the suppression of the hemorrhoidal periodical flux, and in most instances immediate, and in others later relief has been afforded by the mere application of more leeches to the anus: it is therefore as much possible for the hemorrhoidal flux to be critical as it is the local

bleeding, or the application of leeches, which completely supplied the defect of the same hemorrhoidal flux. Besides, what is the object here? To remove the obstruction of the hemorrhoidal vessels, and this species of plethora predominating in the system of the circulation of the *vena porta*, in consequence of the suppression of the periodical hemorrhoidal discharge? Well, this effect can be produced, either by recalling the former sanguineous discharge by the rules of Hygiene, with pharmaceutical remedies, or by substituting local bleeding: and when the liberation of the hemorrhoidal vessels naturally follows, we can say any thing except that it is produced by means of a crisis. Hippocrates fell into this abuse of multiplying the crises, who, as we have already observed in the treatise upon the crises, has left us an example of it. He gives the name of crisis to every change of a disorder, whether acute or chronic.

It is, therefore, erroneous to confound, as is done in the present day, the purely mechanical act of the hemorrhoidal flux resulting from the mechanical dilatation of hemorrhoidal vessels overcharged with blood, with the salutary efforts made by Nature in true crises. Bordeu, and many others, who admit the hemorrhoidal

critical pulse, probably confound it with the intestinal pulse, to which the hemorrhoidal unites itself alternately, or at long intervals, in certain acute disorders, followed by a discharge of various white humours, tinged with hemorrhoidal blood. In such cases, it is clear that these excrementitious humours do not proceed from the hemorrhoidal vessels; but it is the hemorrhoidal blood which unites itself with the excrementitious humours in the cavity of the intestinal rectum: this extreme part of the intestinal tube being occupied by the critical humours, it is impossible the irritation should not take place, which most frequently becomes the immediate cause of the hemorrhoidal sanguineous discharge, especially when the patient is at times subjected to it. The following is a case bearing closely upon the subject in question.

PRACTICAL OBSERVATIONS.

THE white flux was incautiously stopped in a middle-aged female by the empirical use of an injection of astringents, for the purpose of curing a gonorrhœa, of which some one had

made her a present. The patient in a few days was attacked by pains resembling rheumatic ones, which extended themselves successively along the inferior limbs: the fever attacked her on the fifth day of the suppression of the white flux, and assumed the character of a continued remittent fever: aperients were without loss of time administered, in order to reproduce the former discharge, but their effect was unavailing to the patient. In the mean time the pulse was straitened, hard, irritated and quick. On the eleventh day of the disease it became intestinal critical, but at intervals there was observed a certain rebounding and tremulous motion; so that it was doubtful whether the diarrhœa or the hemorrhoidal discharge would come on: at length, on the fourteenth day a great quantity of purulent, mucous and serous humours, tinged with blood, were voided through the intestinal rectum. The perfect recovery of the patient immediately followed.

Now, the red tinge which is found in the critical humours, while they are passing along the intestinal rectum, may arise from various causes, without, however, the seat of the crises being at all in the hemorrhoidal vessels. It may be, that the critical diarrhœa and the periodical

hemorrhoidal flux may encounter each other : in this case the intestinal pulse must alternate or combine itself with the hemorrhoidal pulse ; the critical matters will be tinged with blood, but the hemorrhoidal pulse does not therefore become critical. It is possible that the red tinge of the critical ventral excretions may arise from the existence of certain tubercles or spongy excrescences, which are sometimes found scattered over the intestinal rectum, and in the greater part of the colon of some patients, for the case is not of rare occurrence in practice, that there is generated from these spongy excrescences a given quantity of blood by means of the excrements or critical ventral excretions, which in such cases do not fail to irritate them. One or other of these circumstances may probably have induced Stahl, Bordeu, and many others, to confound the intestinal with the hemorrhoidal pulse, whilst these may alternate and combine with each other on various occasions.

Stahl himself ingenuously confesses having been completely perplexed with difficulties, as often as he endeavoured to determine when the hemorrhoidal pulse was critical and when symptomatic. This was certainly to be expected, when he was endeavouring to distin-

guish one thing from another which completely resembled it. He endeavoured to distinguish the critical hemorrhoidal pulse from the symptomatic one, not because he was certain that it existed, but because he believed that it should do so. Thus Bordeu found the same difficulty in distinguishing one from the other, the critical from the symptomatic hemorrhoidal pulse; nor could it be otherwise, as soon as he wished to find a distinction between two things alike in every respect. His words are these:—"L'état d'irritation, qui
 "paroît presque inséparable du pouls des
 "hémorrhôïdes, est cause qu'on a souvent
 "de la peine à juger si un flux hémorrhôïdal
 "est critique ou symptomatique. Les re-
 "marques que Stahl et ses disciples ont
 "faites sur le flux hémorrhôïdal, quelque
 "utiles qu'elles soient, n'ont pourtant pas
 "déterminé ce qui peut servir à faire cette
 "importante distinction."*

This difficulty of determining when the hemorrhoidal pulse is critical, and when symptomatic, arises from its having been thought critical whilst it was symptomatic,

* Op. cit. p. 297.

or from having confounded the results of the complicated labours of the true crises with the simple effects of the hemorrhoidal flux, which, because it sometimes replaces the suppressed uterine discharge, a neglected habitual bleeding, and at others this or that excretion, has imposed upon many physicians so far as to be considered critical ; the more so, as such a flux appears to cure women afflicted with the vapours, hypochondriacs, persons afflicted with asthma or the gout, and so many other invalids whose credulity causes them to respect the old and vulgar prejudices of past ages.

ART. VIII.

OF THE CRITICAL UTERINE PULSE.

THIS is the pulse which announces the approach, or points out the presence, of the menstrual discharges. The resemblance existing between the pulse of the menstrual purgations, that of the bleeding at the nose, and the pulse of the hemorrhoidal flux, all three harbingers of hemorrhage or sanguineous discharge, may be referred to three known causes. The first is found in the relations existing between them as inferior pulses; the second refers to the identity or simplicity of the type followed by Nature in producing the same phenomenon of the hemorrhage, although this takes place in three different organs; while the almost uniform dispositions which the blood-vessels take in the organs, is the third cause, which, as we have before said, concurs in connecting together the pulses of the different hemorrhages in the same relations, ties and analogies.

The pulse which announces the eruption of the menses, is (to proceed regularly) fuller and more elevated than in the natural state : but the digital part of the artery shows itself, on the contrary, more straitened, concentrated and hard than in the state of health ; and what is still more decisive of its intrinsic character, is the well-marked and distinct granulous formication which is felt in the anterior digital part of the artery. It appears, that between the capacity of this part of the artery and the column of blood there exists a void space, or that the one is greater by the diameter than the other, and that there is a succession of small waves, or round bodies some of which are broken, by dashing themselves against the apophysis of the radius ; whilst it appears that the others fall back again upon those which follow them. Such a conflict necessarily increases the strength, or the expression of the above-mentioned granulous formication, and causes the posterior part of the artery, which is also called brachial, to enlarge itself a little. To this peculiarity is to be attributed the reason of the fulness and elevation, which is, as we have said, most frequently shown by the uterine pulse. To

this peculiarity of the uterine pulse is also generally added the inequality, redoubling and jumping of some of its diastoles.

Now the expression of the organic character of the uterine pulse, as well as the degree of intenseness of its secondary qualities which come after it, vary in proportion to certain circumstances. First, its expression has more strength, and is more pronounced in young females who are touching the time of the first eruption of the menstrual purgations. Nature, who concentrates in the uterus all her power, in order to overcome the resistance opposed to her by the blood-vessels in the first periodical revolution, which is generally troublesome, must necessarily increase the strength, or elevate the degree of expression of the organic character of the uterine pulse; it must also be remarked, that in the uterine pulse there is always a certain feverish motion, which, united to the sensible granulous formication of the digital part of the artery, consequently gives more certitude to the prognostic of the arrival of the first menstrual discharge.

A similar feverish motion, although less sensible, may also be observed in females who are on the eve of losing the benefit of their

courses, on account of the resistance which, for a reason contrary to the former, the indurated vessels of the uterus oppose to the access of the blood which takes place there uselessly at the periodical time, and to the force of habit, which has so great a power in the animal economy. Lastly, the other case in which the organic character of the uterine pulse is well pronounced, and followed by a certain febrile motion, is that of ladies subject to a copious and immoderate loss of blood, whether or not at the usual time: this is, at least, the effect of the agitation in which the system of the circulation of the blood then finds itself. And when the same febrile motion is not met with in plethoric ladies, and such as are of a nervous, or too sensible constitution, at the period of their menstruations, the cause should be attributed, in the former, to the robustness of their constitution; and in the second, to the strength of habit. But in either case, it never fails to pronounce more or less the organic character of the uterine pulse.

On the contrary, the organic character of the uterine pulse is so feebly expressed in ladies who are fat, or given to a dissipated life, that the utmost skill in the art is neces-

sary to discover it ; so that in these two cases, the sensibility of the matrix is obtuse, and the blood-vessels allow, without any resistance, the blood to make its way along their parietes at the time of menstruation. In women of this kind, the febrile motion is not excited, neither do we find the granulous formication, or the conflict of the small round bodies which follow each other, in the digital part of the artery, so distinctly expressed ; its rhythm is also more thin and concentrated ; the reduplications more rare and lighter, and the jumping of the artery is nearly nothing. The inequalities show themselves less sensible, and all these deteriorations of the character of the uterine pulse concur in showing the slightness of the disorder, which affords to the course of the blood the return of the menstrual purgations.

Notwithstanding the above-mentioned deteriorations of the character of the uterine pulse, which are more observable in cold climates, and less so in warm ones ; the difference between this and the other pulses which resemble, or which are allied to it, is sufficiently clear. These are the nasal and hemorrhoidal pulses, that of the dysentery and of the

diarrhœa. The uterine pulse differs from the nasal one, inasmuch as it has not the swelling of the brachial part of the artery, nor even the elevation of a superior pulse; its diastoles are neither so distinctly nor so frequently double, as those of the nasal pulse, nor has it also the hardness and tension of this; it cannot be confounded with the hemorrhoidal pulse, on account of the round bodies, which are smaller and more dry in the latter, and less so in the former; and, *cæteris paribus*, the seat of the granulous formication, or of small bodies in the uterine pulse, does not appear so circumscribed as in the hemorrhoidal, in which it often happens that the granulous formication is most frequently converted into a species of trembling of the digital part of the artery: it is distinguished from the pulse of dysentery, and from that of the critical diarrhœa, because its inequalities never assume the intermittent form which enters into the character of the intestinal pulse, and that of dysentery, although the intermittency be more constant in the first than in the second: and when it happens, as is rarely observed in practice, that those inequalities assume in the uterine pulse the form of intermittency, it

may then be said that the uterine pulse is found united with either one or the other, or with both the intestinal pulse and that of the dysentery.

The office of the uterine pulse is to announce, as we have said, the approach or presence of the menstrual purgations. Now, two cases may present themselves; either that the organic character of the uterine pulse pronounces openly, and maintains itself with energy, as is the case on the approach of the menses, and the more abundant quantity of blood; or that it does not realize either of these circumstances, and in this latter case, either the menses do not take place, or, if they do, the loss of blood consequent upon them is small. Hence, it is of some importance to possess the mental certainty of acting in accordance with the laws of the animal economy in the treatment of acute disorders; since, from the information already given, there results the method, which should be adopted in practice, in order not to overturn the order of the regulations of Nature, by administering remedies when she does not require the assistance of art, or hesitating to make use of them, when actually required. The importance of this truth will appear more evident

in the practical observations, which we shall shortly lay before the reader.

It will in the mean time be most advantageous for the good of practical medicine, to inquire whether the bloody flux of the uterus is critical or symptomatic. Hippocrates observes, that persons whose menses had been stopped, died epileptic in consequence of that suppression.* Galen, his successor, says that it is well known that the hemorrhage of the uterus cures women of several disorders; but he adds, as we have already observed in treating of the uterine organic pulse, that he cannot ascertain whether it is effected by the hemorrhage of the vessels of the left side, or by the vessels of either side of the matrix.† Bordeu, Fouquet, and many others, conform to the old opinions of Hippocrates and Galen, since they include the bloody flux of the uterus among the other critical excretions. In the alternative either of blindly adopting the above opinion of the great luminaries of the medical art; or, of rejecting it without any

* See Aphor.

† Comment. lib. vi. de morb. vulgar.

foundation; we prefer the line of conduct most conformable to the intelligence of the age, that of sifting every fact before we either adopt or reject it. If nothing else, we have at least the certainty of escaping, by this effort of zeal, the reproaches which we might one day incur from our successors, had we adopted without investigation the dicta of our masters.

Before meeting the question, whether the hemorrhage of the womb is or is not critical; it is necessary to distinguish the times in which it is effected. Now the hemorrhage of the uterus is either produced periodically, or it occurs at unusual times. In the first case, it is known to every one that when the bloody uterine flux is retarded, suspended, or suppressed by any cause whatsoever; its absence may be successfully supplied, either by bleeding in one of the feet, or by the application of leeches to the parts adjacent to the vagina or the anus. Besides the inference which may be drawn, that the abstraction of blood from the vessels of the vagina or anus by means of leeches, would be critical, if the periodical bloody flux of the matrix were so, as soon as its defect was supplied either by bleeding at the feet, or the application of

leeches; besides this deduction, we can also adduce many cases, in which the bloody flux of the uterus has not been critical.

It would certainly be a strange opinion to believe so far that the menstrual discharges are critical, whilst they arise in the natural state. And what other object can the crises have than that of making Nature triumph over acute disorders? If this were the case, the menstrual discharges would be of no value, had they no other use in the economy of the animal machine of women. The somewhat sedentary nature of their life, and the plethora predominating in women, have equally contributed to subject them to those periodical fluxes of blood, from the uterus, which are nearly allied with the plethora, or fulness of the blood-vessels of women, which plethora, without such a periodical course of their menses, would increase to such a degree as to expose them to the continual attacks of apoplexy, or of some other, if not strange, at least serious and violent diseases. Nature provides against the approach of such evils by means of the monthly loss of blood: but it does not, therefore, produce the least crisis, inasmuch as the crisis does not take place without its coming accompanied by an acute disorder; and this

is certainly not the case of women, because they have their menstruations in the natural state, an opinion which will certainly not be called in question by any physician.

It will here be said, that the majority of hysterical women suffer continually, but cease to do so at the time of their monthly discharge: this is true to a certain point, but on the other hand, it is not less so that their sufferings return some time after the menstrual discharge has ceased; it is in a kind of suspense, therefore, and not in a total abandonment of their ills that all the advantage of the monthly purgations consists. So the pulmonary phthisis usually stops its progress, and even conceals itself, so to speak, in the period of gestation, and then recommences its course immediately after the birth. It cannot, however, be said that pregnancy is another crisis, which enables Nature to triumph over the resistance of the pulmonary phthisis: why then should the flux of blood from the uterus be said to be critical, when it equally suspends but does not radically remove the sufferings of hysterical women?

In support of this conclusion, two from among many other observations may be brought forward. The first is that of seeing

that the quantity of blood which makes its way through the blood-vessels of the uterus, at the time of the monthly discharge, is always proportioned to the age, physical constitution, mode of living, climate, and therefore to the degree of plethora of women; the more plethoric and provided with blood they are, the greater is generally the loss or quantity of blood resulting from their menses, and *vice versa*. The other observation is, that we find the suspension of the menses for two or three months followed by losses of blood so copious, prolonged and abundant, at the time when the menstruations return, whether naturally, or by the effect of art, as to make us deduce from this correspondence between the duration of the time of suspension of the menses, and the quantity of blood lost, that the menstrual discharges can have no other object than that of lessening and diminishing the plethora of women. For what reason then should this natural effect of the physical constitution, plethora or fulness of the blood-vessels of the uterus of women, which occurs in a state of health, be confounded with the result of the reiterated efforts made by Nature in a state of disease, as in the phenomenon of menstrual purgations there is not the least sign

of concoction, and the character or condition necessary to the mechanism of the crises is wanting?

It now remains to be determined if the sanguineous flux of the courses, which happens at peculiar times, or in acute disorders, occurs in consequence of a crisis, or otherwise. This is even more important than the first discussion, as its object is to determine whether the coming on of the uterine hemorrhage in the course of acute disorders should be encouraged, or prevented and suppressed.

The distinctive character of the matter of a crisis truly concocted consists in its transformation into another substance, which is no longer the same as it was before it was cemented to the action of the system of the circulation of the blood, and the crucible of the excretory organs: such a substance is foreign to the whole organization of man, so much so, that Nature cannot derive the least advantage from it; so hurtful and venomous is it, that as soon as Nature becomes acquainted with it, she instantly rejects and expels it from the human body. Every physician knows the disastrous consequences which result from the retroceding of any critical matter. To resist this truth, is equivalent to

maintaining that the *faecal* matter, the perspiratory humours, &c. can remain for a long time in the human body without injury to it, which would be an absurdity. Now, when the mind is freed from every old prejudice, it cannot but perceive the error which is committed, as often as the attempt is made to assimilate to the critical matter already concocted, the blood which proceeds from the parietes of the blood-vessels of the uterus. Let a chemical analysis be made of both the critical matter and the blood which escapes from the vessels of the uterus, and it will then be seen whether it be correct to consider the uterine hemorrhage as critical.

This false opinion, that the uterine hemorrhage is critical in acute disorders, has arisen from two ancient errors; from not having determined the most essential point of the question, whether this or that acute disorder arose from an excess or defect of tone; and from not having paid attention to the true cause in which it has originated: and hence, one effect has been confounded with the other. It often happens that the sanguineous congestion is the chief exciting cause of acute disorders, and then the arrival of the uterine hemorrhage cannot but be favourable. But there is a

difference between weakening the phlogistic or inflammatory diathesis, by the unusual return of the menstruations, and concocting the critical matter, and expelling it from the body. The first effect is wholly mechanical; arises from the distension of the blood-vessels, and removes the local exciting causes; whilst the second results from the setting in activity, as Nature does, the complicated apparatus of many organs, which are there employed in concocting, modifying, and neutralizing the critical matter, entirely deprived, so to speak, of its former qualities, physical as well as chemical. Now this chemical change of the blood is not found to occur in the desired crisis of the uterine hemorrhage.

Besides this, the blood, such as proceeds from the blood-vessels of the uterus, does not present the least analogy with the character of the critical matter, properly so called; nor can it also acquire it in the above-mentioned vessels, these not being capable of performing the office of those organs, in which Nature is accustomed to determine the matter of the crises to receive its last degrees of concoction or preparation. Nor has it hitherto appeared

that the blood of the uterine hemorrhage is subjected to a chemical or vital alteration, similar to that which takes place in the critical humours, that are concocted by the excretory organs.

Appearances have, however, so far seduced the majority of authors as to make them imagine the contrary of that really offered by Nature, in the examination of the uterine hemorrhage. These writers, because they saw that the uterine hemorrhage turned out advantageously for women affected by acute hypersthenical diseases, deduced the false conclusion that it must be critical. Bordeu, seeing that some women, indisposed with a slight cold on the chest, paleness of complexion, or with some other like slight illness, occasioned by the suspension or irregularity of their menstruations, were cured of their illness, or were at least relieved immediately upon the appearance of their menses, inferred, from their momentary utility, that they were critical. But is it not evident that these ladies were suffering from indisposition arising from sanguineous congestions, produced by the suspension or irregularity of their menstruations, and that, consequently, the only advantageous effect

they could receive, must be either from the return of their courses, or from a general or local bleeding?

The same may be observed on the practical observations reported by Fouquet respecting the uterine hemorrhage, which he also considered to be critical in certain continued and nervous fevers, erysipelas, and similar disorders of the stomach and head. The fact is, that in all the above cases, the eruption of the menstruation has never, according to him, failed in producing the effect, which was expected. We shall not, however, deny to Fouquet the advantage, the utility, or rather the cure of his patients by means of the uterine hemorrhage; but we do not admit his deduction that it must therefore be critical. In one case only, could the uterine hemorrhage become critical or cease to be symptomatic, when there is discharged from the matrix a white, serous, or purulent humour instead of blood. This, from its not exhibiting to analysis and to the senses the least chemical change, cannot consequently be supposed to have been first cemented by the action of the excretory organs, where the work of the true crises actually takes place, notwithstanding that its discharge from the vessels of the uterus acts

as a most efficacious remedy in acute disorders of an hypersthenic character, as well as in those occasioned by irritation or local congestions, in which the uterine hemorrhage is a substitute for symptoms, or the effect resulting from them; but it does not follow, that because the uterine hemorrhage there performs the office of a natural bleeding, it therefore becomes critical.

It was so much the more necessary in medicine to determine in a positive manner the character of the uterine hemorrhage, considered as well at periodical as at extraordinary times, inasmuch as it was expedient to confine ourselves to expect its arrival in hypersthenic diseases of the first or second degree, and to prevent its developement, or arrest its course in ataxic, adynamic, and malignant fevers of that description, in which the abstraction of blood in any way, whether natural or artificial, may be attended with the worst consequences.

PRACTICAL OBSERVATIONS.

The lady of a distinguished Neapolitan advocate, aged twenty-seven, and of a delicate constitution, was attacked by a typhus or putrid fever; the tongue was covered with a dark crust; the pulse small, weak, concentrated, and quicker than in the natural state: the patient was plunged in a kind of coma or deep sleep. On the appearance of these unfavourable symptoms, the husband did not hesitate to call in, with the consent of the medical gentleman attending her, two physicians of Naples, who, after having also prognosticated the unfavourable termination of the disease, were all agreed that, as a last resource of art, the general baths should be used. This consultation took place on the seventh day of the disorder, and the patient from that time appeared somewhat relieved; she still continued improving till the tenth; on the eleventh the uterine pulse appeared; there came on the expected menses, and the sensible deterioration of the vital powers was the necessary consequence; all the resources of art were ineffectual, and the fatal prediction of the physicians was verified on the morning of the twenty-first day. In many other ataxic fevers,

followed by the uterine hemorrhage, we have seen the same lowering of the vital powers, and subsequently the patient's death.

Hence, whatever may be said of so many prodigies, which are attributed to the eruption of the courses, or the uterine hemorrhage; this apparently performs the office of a crisis, in certain acute hypersthenic, or phlogistic diseases; because in them the abstraction of blood, whether natural or artificial, is advantageous. The uterine hemorrhage affords relief, also, in some spasmodic affections, produced by some local congestions: but the uterine hemorrhage is not on that account entitled to the value which the true crises possess, from which a favourable opinion is formed of acute diseases of every kind; and whilst the true crises decide by the assistance of Nature the contrast, which arises between her and the causes of acute disorders; these, on the contrary, more frequently triumph over the efforts of Nature, when they are of an asthenic character, and are followed by the uterine hemorrhage. And where is the experienced physician who, in the treatment of malignant fevers, would await the eruption of the courses, or the arrival of the uterine hemorrhage?

Whatever may be the reader's judgment respecting the decision we have pronounced upon the question, whether the uterine hemorrhage is critical or not; he will not deny the uterine pulse the merit which it possesses, of announcing its arrival or indicating its presence; and this is sufficient for the information and guidance of the physician: for is it not the presence of the uterine pulse, which warns the physician or surgeon to prevent the miscarriage with which pregnant women are so very often threatened? Examples of similar accidents removed, prevented, and avoided, by means of the information afforded by the uterine pulse, are too frequent in practice to render any eulogium of it necessary. Is it not the presence of the uterine pulse, combined with the intestinal or stomachal one, which refers the origin of spasms or pains in the stomach, to the resistance which the blood meets with in the vessels of the matrix, on the approach of the eruption of the menses? Hence, it is certainly satisfactory to overcome or to put a stop to this kind of colic, by the use of an infusion of saffron, or by bathing the feet, which help the flow of blood from the uterus.

And when the uterine pulse shows itself at

intervals, and without that sustentation, which is necessary, as happens very often with young and chlorotic women at the periodical time of their menses: when this happens, is it not the information of the uterine pulse, which suggests the method to be adopted, in order to remove the obstacles, or the resistance of the vessels of the uterus, by the means of hygiene, the use of the preparations of steel, or bleeding? Following the indications of the pulse, it will be seen when the suspension, the retardation, or the suppression of the menses, arises from the state of languor or inertness of the vessels of the matrix, and when it results from their over-fulness. Nor is it a trifling thing, lastly, to be able to foresee, by the information of the uterine pulse, the intentions of Nature in the various diseases of women; because we always then possess the advantage of being able to second or correct her from the commencement. Nature can be seconded, and the arrival of the uterine hemorrhage be accelerated in acute diseases of excessive tone, in those which arise from spasms, chlorosis, suspension and suppression of the menses, and similar ones; and she can be corrected by turning her from her intentions in ataxic, asthenic, and pituitous fevers, and in all other

diseases in which the least abstraction of blood is contrary to their indication ; since the uterine hemorrhage has not, as we have said, the merit nor the value, or intrinsic character of making a favourable judgment of the acute disorders, as do all the true crises, or the crises properly so called.

ART. IX.

OF THE HEPATIC CRITICAL PULSE.

THE character of the hepatic critical pulse consists, according to Bordeu, in the concentration and inequality of its beatings. To two or three unequal rhythmi, he says, succeed three others perfectly equal, if not completely natural. The hepatic pulse, he adds, is neither hard nor tense; it exhibits itself less strong and less agitated than the uterine pulse; nor appears so concentrated as the stomachal pulse, and is less lively and unequal than the intestinal one; its diastoles are never double, at least it is not found united with any one of the pulses which announce the various hemorrhages.

From which it will be clearly seen that Bordeu admits the hepatic critical pulse, and to prove its existence, he produces in his work the example of the jaundice which succeeds or supervenes in consequence of the crisis, which, according to him, is operated in the

liver. The fact is, that the jaundice is a disease which is derived more often from affections of the mind, and as such cannot perform two parts at one and the same time, that of a disease and that of a crisis; there is also another consideration to make, which is, that since the bile diffused through the mass of the blood, in the presence of jaundice, is not ejected from the body by any excretory organ, there does not exist the least crisis. The crisis properly so called takes place at the time when Nature succeeds in effecting, amongst others, two principal operations: we mean the concoction and the expulsion of the critical matter. Now both these operations are wanting in the phenomenon of the jaundice. In the first place, the concoction is wanting; for, the bile spread through the blood-vessels is a humour nothing altered from its proper nature; and this is certainly not the case of any other matter really critical, since this has no longer, as we have said, its former nature or character, as soon as it is reduced into a third substance; and the second operation, viz., the expulsion or excretion of the critical matter, is wanting also as soon as the bile continues to remain in the humoral mass, which is precisely observed in the presence and course

of the jaundice : it is not therefore suitable to the actual state of science to continue to believe the jaundice as critical, whilst the conditions necessary to the mechanism of the crises, properly so called, do not concur with it in the phenomenon of the diffusion of the bile into the mass of the blood. It is certain that Nature cannot remain inactive in the presence of the jaundice : on the contrary, she usually makes vigorous efforts to confine the bile within the urinary system or the intestinal tube, and after the concoction to effect its excretion, either by the means of this or that excretory organ. The urinary system, or the intestinal tube, is therefore that which operates the crisis, and not the liver. Besides, it is very difficult, as Bordeu himself ingenuously confesses, to find in similar cases, the hepatic pulse isolated from the intestinal or the urinary one ; which clearly proves that the hepatic pulse acts there a secondary part, as it then indicates at most, the affection of the liver, which is the cause of the jaundice, and that the intestinal or urinary pulse announces, on the contrary, the presence of the crisis : all the affections and partial obstructions of the liver, without excepting that to which the jaundice generally owes its existence ; all

of these are announced by means of the hepatic pulse; but this, as has been seen, is organic and not critical. The error of confounding one with the other pulse was inevitable at the time of Solano, Bordeu, and all the other authors who lived before the truly useful discovery of organic pulses; as, being unable to acquire the actual knowledge relative to organic pulses, or having formed only an obscure idea of them, it was to be expected that they should be incapable of distinguishing one pulse from the other; that is, the critical hepatic pulse from the organic; which did not then exist. To this may be added another important consideration, that very often the crisis comes after the jaundice, which Nature effectually operates by means of the urinary system, or of the intestinal tube: and it was that circumstance which induced Bordeu to believe the jaundice critical, although he had seen the excretion of the critical matter operated by means of the urinary or ventral fluxes.

The whole difficulty of this truth is in comprehending that the jaundice occasioned by hypochondria, or by any other affection of mind, is not, as others think, a natural consequence of the crisis operated by the liver:

the jaundice is another infirmity incidental to the human race, which must be treated with the resources of art, unless it appear from the presence of the intestinal critical pulse, or from the urinary one, that Nature has the intention of bringing about the crisis, as she naturally does, when she employs the tonic movements of the intestinal tube or of the urinary apparatus ; which explains the reason of the combination of the hepatic pulse with the intestinal or urinary one, of which we shall shortly treat. Hence it is clear, from what has hitherto been adduced, that the hepatic critical pulse ought no longer to be included, as has been hitherto the case, among the pulses really critical. To this consequence we are at least led by the following practical observations.

PRACTICAL OBSERVATIONS.

ABOUT three years since, the jaundice attacked a young man of letters, in consequence of a violent attachment to a young lady, whose friends would not consent to their union. The patient's pulse was low, that is to say,

concentrated, thin, tense and unequal; a small eminence arose between the index and the middle fingers, and its smallness and concentration increased at the time when the melancholy was deepest; so that it was clear from the presence of the organic character of the hepatic pulse, and from the difficulty of the daily digestions, that the action of the disappointment, or negative he received, had already made a morbose impression upon the vitality of the liver. This state of things continued for the space of two weeks; at the end of that time the pulse became intermittent; that is, its inequality took the form of intermittency; the small eminence transformed itself into a small globule, which struck the end of the index finger, in almost every diastole; its rhythm became also more lively: in short, there was no longer any doubt upon the presence of the intestinal critical pulse, which exhibited itself in its usual features upon the approach of the critical diarrhoea, which took place four days after the change of the hepatic organic pulse into the critical intestinal one, although from time to time it appeared under its first character.

Now who does not see two well-marked and distinct periods in the course of the above case? The one is that of the affection of the liver, and of the jaundice which followed, and was indicated by the presence of the hepatic organic pulse; the other is that of the diarrhoea, which was announced by the intestinal pulse. The one period, I repeat, is distinctly divided from the other. And notwithstanding that in similar cases the hepatic and intestinal pulses meet and alternate, it cannot be denied upon their being found together, that the one is a symptom of the affections of the liver or of the jaundice; whilst the other arises from the efforts of Nature, who elevates, exalts, and sets in activity the intestinal tube for the concoction and expulsion of the bile already reduced to an excrementitious substance.

The other case we here report, has reference to the prejudice which still obtains, that the jaundice may perform the office of a crisis; without reflecting, that the critical revolutions take place in the course or at the end of diseases, and that the former cannot exist when they are not preceded by the latter. It is true, it was formerly said, that one disease destroyed

another; but this does not prove that the one serves as a crisis to the other, when it is not in fact the result of a salutary effort of Nature. It requires no little ingenuity to support in practice such an absurdity of the old school.

A gentleman about forty years of age, living in London, complained for a considerable time of a painful sensation in the right hypochondrium: to the more or less sensible degree of pain which he felt in that region of the body, corresponded the greater or less degree of expression of the organic character of the hepatic pulse; the indifference, if not negligence of the patient, for any remedy which might benefit him, contributed to the developement of the jaundice. A yellow tinge covered the whole of the face, and the degree of the colour varied in proportion to the dispositions of his mind, and the changes of the atmosphere. Now two circumstances, among others, must be remarked, that the organic hepatic pulse, which showed itself at one time more, and at another less pronounced, was never entirely absent; and that the jaundice did not disappear till the moment in which the affection of the liver, the cause of the jaundice, was treated according to the rules of art, and consequently re-

moved. Both the mentioned cases lead us to conclude, that the hepatic pulse is organic and not critical; and that the jaundice, which differs not from a disease, cannot perform at the same time the functions of a crisis.

ART. X.

OF THE URINARY CRITICAL PULSE.

By the assistance of the urinary critical pulse, is ascertained the arrival of the critical excretion of the urine, which is generally effected in the course or towards the end of certain acute diseases by the urinary apparatus, whence it has derived the name which distinguishes it. This pulse, although it cannot exhibit itself, and does not, in fact, appear furnished, as we have said, with any mechanical character, in the examination of the organic urinary pulse; yet, nevertheless, the regular inequality of its beatings is so sensible to the touch, as to determine and specify its character sufficiently to prevent its being mistaken for any other pulse. In a word, its pulsations gradually diminish in fulness and strength as no longer to be felt, so small and weak do they become: they then recover themselves with the same gradation, and return to their former state of fulness and

strength. Thus, the first pulsation which succeeds to those which are on the decrease, developes and exhibits itself with considerable energy, or, as Fouquet says, with a kind of explosion or forcible dilatation, combined with a slight reduplication.

Fouquet likens this dilatation of the urinary pulse to another rhythmus of the pectoral critical pulse, so great is its softness and elevation. It was the softness of its marked oscillation which probably induced Solano to say that the urinary critical pulse is generally soft. In the course of this examination, we shall see what value is to be placed upon Solano's saying, respecting the softness of the urinary pulse. The above regular inequality, however, is the division or distinctive character of the urinary critical pulse.

All the ancient sphygmists make mention of the urinary critical pulse: thus, seeing that its oscillations went off, gradually diminishing, like the diameter of a mouse's tail, from this resemblance, they gave it the name of *myurus*, from *mus*. Without entering into the spirit of the resemblances from which Galen, the Egyptians, and others, improperly derived the names of various pulses; we shall prefer endeavouring to examine thoroughly the various

opinions which still divide authors upon the true character of the urinary critical pulse. Solano, in fact, makes the character of the urinary critical pulse to consist in the softness and intermittency of its rhythm; whilst Prospero Alpinus says that he has observed it only sometimes mixed with intermittency, and more often thin and hard. Bordeu attaches himself to the general observation that the rhythm of the urinary pulse gradually diminish in fullness and strength, so as to disappear, and afterwards return to their former state; with the difference, adds Bordeu, that the second pulsations, which succeed the first, are all more developed, sufficiently equal, and rather jumping; whilst Fouquet confines himself to saying, that it is only the first pulsation, after those which have been on the decrease, which recommences with force and energy, or that exhibits itself with a kind of explosion, accompanied by a slight reduplication.

The origin of these different opinions is to be found in the modifications and variations of the urinary critical pulse, which were erroneously referred to the diversity of its character: the fact is, that various secondary circumstances arise in practice, and these all con-

cur in modifying its progress and character. It must first be observed, that the fluxes of urine, although copious, are not always critical; these, in nervous affections and diseases, which nearly affect the nervous system, are generally symptomatic, and as such must necessarily be indicated by the closeness, hardness, and also by a greater degree of concentration of the urinary pulse, such as it was observed by Prospero Alpinus: but certainly the urinary pulse is not found so hard and close upon the approach, or in the presence of the urinary fluxes which are really critical; in these it is, on the contrary, rather soft, as observed by Solano. As to the intermittency with which Alpinus and Solano believed the urinary pulse endowed, it is doubtless owing to the presence of the intestinal pulse, which is more frequently found combined with the urinary critical one. Patients have generally at the same time copious discharges of fæces, and of considerable fluxes of urine; but it is not on this account that the intermittency has nothing to do with the beatings of the urinary critical pulse.

To this must be added another consideration, that Nature does not operate in one or two individuals only of the human race the

critical excretion of the urine ; she usually produces it in an immense number of patients, and the difference of sex, climate, age and complexion of these individuals, causes an infinite variety in the modifications of the urinary pulse, although this latter always exhibits itself with the same intrinsic character. Besides, it is of no utility to oppose the evidence of so many other secondary causes, which stimulate Nature herself to effect the critical excretion of the urine with more force and energy in one individual, and with less in another. All this concurrence of circumstances, which has not certainly been appreciated or taken into consideration by authors, has produced that discrepancy of opinions which has hitherto divided them.

What at present is of the greatest moment, is to know when the urinary pulse is critical, and when symptomatic ; that is, when it announces the fluxes of urine really critical, and when it merely predicts the forced or symptomatic excretion. This difference results from the state of softness, of which Solano speaks, and from the hardness, and strong concentration of the rhythm of the urinary pulse. In the first case it is critical, and in the second, symptomatic. Whether the urinary

pulse be critical or symptomatic, it always shows itself with the above-mentioned regular inequality, which is, on the other hand, more distinctly marked in the one and less so in the other; but, besides the greater or less elevation of its regular inequality, which forms the character of the urinary critical pulse, or of the urinary symptomatic one; there also concurs in the first, if not the softness, at least the tendency of its rhythm to that quality, and their vivacity and rather round form. In this, the pulsations which succeed the first ones, establish themselves with vivacity, energy, and strength: whilst they are not so in the urinary symptomatic pulse, whose beatings are found to be more or less close, concentrated, hard, and in no degree round.

After having distinguished one from the other, the urinary critical pulse from the symptomatic, it is necessary to examine the artery several times, for the purpose of ascertaining if the urinary critical pulse be alone, or accompanied by the intestinal one: this precaution is of no small utility in practice, for it often happens that one is confounded with, or taken for the other. These two pulses, the urinary and the intestinal, generally alternate, succeed, or meet with each other. Hence, the above

precaution is necessary, in order to discover if one is superior to the other, or if both will resist equally. In such a case, the urinary and ventral fluxes appear immediately, or soon after. To this kind of affinity between the urinary system and the intestinal canal, must be referred the reason which made Hippocrates say, that the looseness of the belly follows the elevation of the hypochondria, accompanied by a murmuring or gurgling of the intestines, or by pains in the loins, unless, he adds, the wind does not escape from the intestinal rectum, and a copious flux of urine does not come on.* So difficult is it for the belly to perform its functions without the consent of the vesica, or that the action of the former should not be reflected upon that of the latter.

The urinary critical pulse generally shows itself, as we shall see, in the course or towards the end of certain malignant fevers, in jaundice, in hypochondriacal affections, and in some acute dropsies, when the salutary efforts of Nature are seconded by art. Thus, it is the presence of the regular inequality of the urinary pulse which should guide the physi-

* Aphor. 73, Sec. 4.

cian in the treatment of the different dropsies; since if it happens that the urinary pulse has not all the strength necessary for developing its critical character, or that developing it, it does not retain it long; in both these cases it becomes necessary to strengthen the efforts of Nature, either by the specific action of the nitrate of potash, or by the activity of extract of hemlock, by preparations of mercury, squills, digitalis purpurea, or other diuretic remedies. The certainty of the utility of the means of art results from the expression, more or less pronounced, of the regular inequality of the urinary pulse: the more the second oscillations succeeding the first, which are on the decrease, establish themselves with strength, vivacity, and energy, the greater is the certainty of their utility, and better founded the prediction, that the critical excretion of the urine will succeed, and *vice versa*.

PRACTICAL OBSERVATIONS.

AN inhabitant of Philadelphia, about 45 years of age, and of a delicate constitution,

was attacked by a malignant fever, with symptoms which indicated pretty clearly the affection of the brain; the pulse was capital, tense, hard, quick, and irritated. Nature seemed uncertain and embarrassed; for, the irritation of the pulse did not cease till the fourteenth day of the first attack of the disorder: at past two o'clock in the afternoon of that day the pulse was found elevated, strong, and rather wavy, so that it was hoped that Nature would have promoted the critical sweat: this however was not the case, for on the fifteenth day the pulse concentrated itself, and from being superior, became inferior; the red colour of the face, was succeeded by paleness, a change which did not fail to alarm the bystanders: on the seventeenth day the urinary pulse exhibited its regular inequality, mingled with intermittency; the critical excretion of several and always copious ventral and urinary fluxes followed on the nineteenth, and continued at intervals, till the twentieth; after which the patient was restored to health.

A young Frenchman, about 27 years of age, of a robust constitution, was attacked in London, about two years ago, by the small pox, his parents having neglected to vaccinate him. Now, without taking notice of the attacks of the

severe symptoms of a confluent variola, that the patient suffered in the two periods of eruption and suppuration; in the third period also there came on a kind of malignant fever, accompanied by all the symptoms of approaching death. A musk and camphor mixture was immediately administered to him, and by this energetic assistance of art, the vital powers were in some measure raised from that extreme degree of prostration; and on the seventeenth came on the critical excretion of repeated fluxes of urine, which decided the salvation of the patient's life.

ART. XI.

OF THE CUTANEOUS CRITICAL PULSE.

THE reverse of the medal of the urinary critical pulse represents the cutaneous critical one. The oscillations of this pulse, instead of diminishing gradually in strength and fulness, in proportion as they remove from the first oscillations, as is the case in the urinary pulse, on the contrary elevate in the cutaneous pulse some of its oscillations upon the others, like so many waves, and gradually react upon the organ of touch with greater frequency and fulness: so that the second oscillation is more elevated than the first, the third more than the second, and so on to the fourth, sixth, or to the eighth oscillation: then this inequality ceasing for a short time, appears again, and thus the cutaneous pulse continues alternately to show itself till the termination of the course of the critical excretion of sweat. And whilst the cutaneous critical pulse gives signs at intervals of a

kind of waving, it fails not at the same time to exhibit itself full, dilated, elevated, soft and flexible, so much so that it might be taken for a superior pulse, and more especially, might be confounded with the critical pectoral one, were it not unaccompanied by any organic character: in addition to which, the cutaneous pulse has not that eminence which rises in the central part of the pulsatile artery, and which constitutes the radical character of the pectoral pulse.

One thing worthy of remark, before we proceed farther, is that of all the kinds of pulse described by Galen, that species which announces the critical sweat, has resisted the attacks of the critics of every age; but it cannot be denied that his successors have improved its description. Amongst other innovations, may be reckoned the variety of names, hitherto given to the critical cutaneous pulse. Some, on account of its regular inequality, in which the oscillations raise themselves one above the other like the waves of the sea, have called it wavy; others call it the cutaneous pulse, or the pulse of the superficies of the body; and others, as Solano, for what reason, I know not, *inciduus*. These assert that the elevation of some os-

cillations upon the others, do not exceed the fourth beat; whilst cases are not wanting in practice, which prove the contrary. Besides, it is known that the duration and intenseness of the inequality of the pulse, depend also upon the various degree of strength of the causes which give rise to them, and that the law of limiting the elevation of the wavy undulations to the fourth beat, has not been imposed by Nature, as she herself could not prevent the effects from corresponding with the degree of strength of their causes. Thus, the assertion of Solano would be also injurious to the progress of science, because it would appear that from the prolongation of the wavy elevation of some undulations over others, the approach, more or less near, of the critical sweat, and the copiousness of that excretion, could not be ascertained.

The maxim of the ancients, that the approach of the critical sweat and its copiousness may be deduced from the colour, more or less red and inflamed, of the face, is not always borne out by facts; because either the arrival of the sweat does not take place in some cases, notwithstanding the existence of such a phenomenon, or the copiousness of the critical excretion of the sweat, when effected,

does not correspond with it. The existence of the colour and inflammation of the face may arise from the great power of the inflammatory fevers and pyrexiaë, in which the critical excretion of the sweat usually takes place; but not the prolongation of the elevation of some oscillations over others, this being the effect of the energy and strength which Nature employs in producing the above-mentioned excretion in the cutaneous system. Hence, it is much more regular to found such a prediction upon the duration of the regular inequality than upon the red colour and inflammation of the face, a duration which finally indicates the presence and greater concurrence of humours to the superior organs, and hence to the external superficies of the human body; and it is natural, that the ventricles of the heart and arteries should continue a longer time to contract with greater frequency and strength, which prolongs the regular inequality of the cutaneous pulse, in proportion as Nature concentrates more critical humours in the superior organs, or in the superficies of the body.

The other precaution to be taken before predicting the approach of the critical sweat, is to see if the inequality or wavy undula-

tion of its first beats is accompanied by their softness, or by their hardness; not only in order to distinguish the critical and salutary sweats from the symptomatic, forced and morbose ones; but also to follow in the treatment of acute diseases the spectatrix medicine of Hippocrates, or an active and efficacious practice.

The latter is to be preferred to the former, when the cutaneous pulse shows itself hard, tense, and rather thin; but not if it be soft, dilated, and flexible. In this case Nature disdains being disturbed by any active, if not forcible means of art; for, when the critical sweat is not altered, weakened, or suppressed by the action of remedies, it takes place, and judges favourably the acute disorders; whilst the forced and symptomatic sweats prolong their course, when they do not impart to them a worse character.

The critical sweat is more or less universal, fat, coloured, and often foetid; whilst that which results from the severity of pains, spasms, &c. does not afford life the least relief, but rather more often weakens its strength. It is only in intermittent and remittent hypersthenic fevers that the sweats, although symptomatic, are accustomed to les-

sen in some degree the animal temperature, then too high ; and in this way they relieve, to a certain extent, the patient at the moment of their decline, the moment in which the aridity of the skin and the dryness of the tongue are diminished, but not entirely removed, at least till the return of a fresh paroxysm. Decidedly favourable, on the contrary, is the result of the critical, universal, coloured, greasy and foetid sweat : this, when it takes place towards the close of continued fevers, pyrexiaë, phlegmasiæ, inflammatory fevers, fluxions of the breast, or other similar disorders, not only immediately affords the patient a state of ease and relief, but also eventually overcomes any resistance which may be offered by these diseases.

PRACTICAL OBSERVATIONS.

A MIDDLE-AGED lady was attacked by a severe pyrexia ; the pulse was irritated, hard, close and frequent ; she was bled copiously twenty-four hours after the attack of the disease, and nitrate of potash was immediately adminis-

tered to her, dissolved in temperate water. The pulse became cutaneous on the fifth day of the disease; its oscillations rose at intervals one over the other, like the waves of the sea; they were full, dilated, developed and marked by a certain degree of softness, so much to be desired in this kind of pulse. The critical sweat showed itself on the sixth, and the pyrexia terminated its course on the ninth day.

A person living in the vicinity of Philadelphia, about 36 years of age, and of a particularly strong constitution, was attacked by an inflammatory fever, in consequence of drinking pump-water while in a state of profuse perspiration. It was at first supposed that the patient must give way before the deplorable state of insensibility of the pulse, so much had the action of the cold water paralyzed the contractions of the heart and arteries: this inconvenience was remedied, and the inflammatory fever immediately made its appearance. The pulse was quick, strong and hard; several general and local bleedings were performed, followed by the antiphlogistic method of cure. On the ninth day of the disorder the pulse became soft, flexible, more dilated, more developed, and there was to be remark-

ed in it, at intervals, the elevation of some of its pulsations over the others, an inequality which extended itself even to the sixth beat; so that it was not difficult to predict the arrival of the critical sweat, which was effected on the tenth, and was copious, viscous, coloured and greasy. The patient was perfectly restored to health on the fourteenth day.

ART. XII.

OF THE CRITICAL, COMPOUNDED AND COMPLICATED PULSES.

THE union of two or more simple pulses, which takes place in acute disorders more frequently than is imagined, gives rise to the compounded pulses ; and when to these is found united the pulse of irritation, we then have an instance of the complicated pulses.* They may all succeed each other alternately, or combine together. Galen saw the compounded and complicated pulses, but speaks of them in too vague and general a manner. A proof of the combination of several simple superior pulses is found in the coryza or cold, which extends itself from the nostrils to the throat and chest. In this case, the nasal, the guttural, and the critical pectoral pulses alternate successively one with the other, or

* See the Treatise upon Critical Pulses in general.

remain all together for a certain time : then, the pulse which most resists, or which predominates over the others, is that which particularizes the kind of excretion about to take place. A similar proof is to be found in the fluxions of the breast, in which both the pectoral pulse and that of the critical sweat take place together. In fact, the case is not rare of seeing patients expectorate and sweat at the same time. The nasal, the pectoral and the cutaneous pulses, all three are used to combine together in certain catarrhal fevers.

In the pleurisy the pectoral pulse is often united with that of the sweat; and these either alternate with each other, or one predominates over the other, or both preserve an equal degree of strength. To the superior critical pulses succeeds not unfrequently the intestinal pulse, which announces the approach of the critical diarrhoea : the like case often occurs in acute fevers, in fluxions of the chest, and in several other affections of the lungs. At other times, it is some other superior pulse which succeeds the intestinal one, examples of which are to be found in ataxic fevers. The urinary and the intestinal pulses usually succeed each other by turns in certain phlo-

goses of the viscera, or meet together as they do in different kinds of malignant fevers, in inflammations of the kidneys, and the vesica. In short, there are in practice examples so striking and so numerous, of several simple pulses, alternating, meeting, combining with, or succeeding each other, that it would be waste of time to endeavour to demonstrate the contrary.

In order, however, to proceed with caution, and a knowledge of the cause, to the prediction of any critical excretion, it is necessary to observe if there be any critical pulse which maintains itself for a longer time than another ; and if at the same time its organic or critical character be well pronounced and distinct. The necessity which Nature is under in multiplying her efforts in acute diseases, complicated and of a malignant character, is the cause of the different combinations of the critical simple pulses. By employing more excretory organs, and by cementing with their action alternately the critical matter when it is tenacious, or when it strongly resists its concoction ; by so doing, Nature intends to oppose resistance to resistance, and to overcome, with the co-operation and concurrence of more excretory organs, the perverse and malignant

acute diseases, which would more frequently triumph over her efforts, were she to confide the successful termination of them to the labours of one organ alone. The disease would certainly be serious, if, at the end of this struggle, one pulse was not found to be more developed and more pronounced than another, or that one did not predominate over the other ; but not when Nature confines in the last place the matter of the crisis to one excretory organ, better adapted for its complete concoction and expulsion, after having subjected it successively or alternately to the activity or action of several other excretory organs. This is the reason why it becomes necessary in the beginning to observe whether any critical pulse maintains itself for a longer time than another ; and whether, at the same time, its critical character be more open, more clear, or more developed ; this pulse being the one which properly predicts the species of crisis about to take place.

The case which, in practice, produces much alarm, and gives just reason to fear the unfavourable and fatal termination of acute disorders, is that of seeing several critical simple pulses alternate with that of irritation ; or, what is still worse, that the latter succeeds to

the former, and obstinately persists in so doing. Such is the character of the convulsive pulse, or the pulse of irritation, that in vain should we expect to see a complete and perfect crisis in its presence. The state of irritation necessarily gives reason to suppose the existence of a foreign cause, or of some local affection confined in some organ important to life. Hence, any critical excretion, which is effected by Nature, when the pulse of irritation intervenes, and maintains itself for a considerable time, is always of sinister augury.

The tenseness or convulsive state of the pulse, which is the effect of the irritation or violence caused to life by malignant and foreign morbose causes, must necessarily suspend the course of the crisis, when it has commenced; and the more Nature endeavours to overcome the resistance of the disease, the more in proportion does the degree of irritation oppose her efforts; hence it is, that the increase of the irritation suppresses altogether the course of the crisis, and the crude or half-concocted humours which remain as if imprisoned in the excretory organs, paralyze their strength and operations, and end by affecting the vitality and the tissue of the organs themselves. In the mean time, the disorder pro-

ceeds on rapidly, and favoured, as it then is, by so many local affections, it becomes still more serious, and increases in proportion the danger which threatens the patient's life. The vital powers oppressed, almost exhausted, and brought low, by the long duration of the disease, and by the presence of the crude humours, kept up by the irritation, become exhausted, and life is instantly extinguished. Such is the fatal spectacle offered to the senses by malignant fevers, followed by crises stifled, suspended, and suppressed entirely by the state of irritation. Under such deplorable circumstances, it is of no use to allow ourselves to be seduced by the apparent indication of recalling the crisis suppressed by the irritation; it is necessary to remove, if possible, the irritation by the most efficacious means of art, especially by stimulating, raising and sustaining the vital powers; and when these have been to a certain degree improved, recourse may then be had to those remedies which are more calculated for recalling the sweat, the diarrhoea, the expectoration, or any other critical excretion, of which Nature had commenced the production before the pulse of irritation had come on.

The pulse of irritation which is thin, concentrated, and hard, does not indicate the

same danger in the access or paroxysm of fevers, and much less in the attacks of gout, nervous rheumatism, colic, and many other spasmodic diseases. In this kind of affections, the question is not about suspended or suppressed crises, nor of the profound prostration of the vital powers; in these affections the cause of the pulse of irritation must be referred to the alteration or to the irregularity of the nervous action, which may replace itself in the natural state, or be re-established from one moment to the other, and the above-mentioned affections disappear immediately. Neither is such a pulse of irritation of bad augury in the access or paroxysm of acute fevers, because it is immediately removed by the developement of the vital powers, which generally succeeds to the tenseness, contraction or spasm of the cutaneous vessels, or to the first period of these fevers; only when it maintains itself in the other periods, it induces the mind to believe the contrary. The pulse of irritation is always, however, a bad omen at the suspected period of the crisis, because, when it does not arrest its entire course, it alters it so as to render it false, spurious, useless, and more often fatal, unless it is found to be temporary, and unless its presence be of short duration.

The other important object of the physician is certainly that of distinguishing in practice two kinds of pulse of irritation, one worse than the other: the first kind is characterized by a small, slow, concentrated, hard and thin pulse; this, as we shall see, is of more unfavourable augury than the other species, because it generally maintains itself, and resists for a much longer time the resources of art, and then it either announces great and insurmountable obstacles in the secretory and excretory organs, or a more pertinacious adherence of the morbose cause to the sensitive powers, or, in short, the presence of a profound organic affection. The pulse is frequently of this nature in the first days of certain surgical operations, and in the first hours succeeding the long and painful exhaustion of difficult labour, as well as in various other cases of acute diseases of the worst character. What circumspection, energy and knowledge, therefore, should the physician possess in the presence of this kind of pulse of irritation! The other species now to be considered is of no small interest, as well on account of its not being attended to sufficiently by a great number of practitioners, as because it requires all the skill of the art to prevent mistaking it. This species of

pulse, of irritation being indicated by the elevation and strength of its beats, causes the spasmodic tenseness of the artery, which then properly constitutes its character, to escape from the touch and observation of the physician. The best method we can propose to young practitioners, is that of familiarizing themselves with the physiognomy or form of this kind of pulse in the cases of wounds, whether penetrating the head or not, in which cases it exhibits itself such as we have described it: as to the origin of the difference which takes place between each species of pulse of irritation, this is found in the different degree of sensibility of the affected or diseased organs; in the kind of their affections; in the position which they occupy in the various cavities of the human body, and lastly, in the state or condition of the vital powers. This, at least, is the usual course which Nature points out and shows in the difficult examination of the pulses of irritation.

THE END.



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ERRATA IN THE SECOND VOLUME,

PAGE	LINE	
15	8	<i>for authorize read authorized,</i>
20	8	<i>for is weakened read being weakened.</i>
37	1	<i>for dilation read dilatation.</i>
73	11	<i>for is not alarming read is not so alarming,</i>
76	14	<i>for exanthemical read exanthemata.</i>
89	1	<i>for venæ cavæ read venæ cavæ.</i>
116	10	<i>for " magnopereinter" read " magnopere inter."</i>
144	14	<i>for annulor read annular.</i>
150	18	<i>for if not identical read if it is not identical.</i>
—	19	<i>after fevers dele is.</i>
183	2	<i>for " asteriæ" read " arteriæ."</i>
185	2	<i>for mucus membrane read mucous membrane,</i>
186	24	<i>for dyspnæa read dyspnœa.</i>
204	27	<i>for that is, of read that is, from.</i>
275	17	<i>for " hæc non fa llunt" read " hæc non fallunt."</i>
438	1	<i>for do not exceed read does not exceed.</i>